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USE OF SAYRE HEAD SLING IN OSTEOARTHRITIS OF CERVICAL PORTION OF SPINAL COLUMN

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In 1877, Sayre described a suspension apparatus which he called a head sling. In time this became known as "Sayre's head sling."

The suspension of a patient by his head, his feet being allowed to dangle in order to correct Pott's disease, is no longer employed, but Sayre's head sling still is a part of the equipment in most orthopedic departments. In the past few years we have found the sling valuable in selected cases of primary osteoarthritis of the cervical portion of the spinal column.

Several writers^{2,3,4,5} demonstrated that hypertrophic spurs may encroach on the spinal foramen and the nerves that pass through them, causing symptoms referred to the region of distribution of some efferent portion of those particular nerves. Bony changes frequently occur in osteoarthritis of the cervical segment of the spinal column. These changes are found most often in the lower cervical vertebrae, from which emerge the sixth, seventh and eighth cervical nerves. It is well to recall that from these segments a considerable portion of the fibers originate which supply the pectoralis major and minor, the teres major and minor, the subscapularis and deeper portion of the latissimus dorsi muscles.

If osteophytes are narrowing or encroaching on the foramen from which these nerves emerge, it can readily be understood how a patient could have pain over the precordial region, where the pectoralis major and minor lie, or in the region of the shoulder or arm, where the subscapularis, teres major and minor form part of the shoulder girdle.

The brachial plexus also arises from the lower four cervical nerves, together with the greater part of the first thoracic nerve. As these nerves supply the skin and muscles of arm and forearm, pain and paresthesia, although infrequent, can occur in any portion of the upper extremity.

Usually, the patient who has osteoarthritis of the cervical portion of the spinal column complains of a dull ache, largely confined to the region of the shoulder and arm. The patient may not complain of pain in the neck or he may have noticed that by hyperextending the neck he can produce pain in the region of the shoulder, arm or precordium.

Turner and Oppenheimer⁶ described varying degrees of weakness in the arm or forearm and, occasionally, atrophy in the interosseous muscles. A great many of their patients, although not complaining of pain in the neck, revealed bony changes in the cervical segment with definite narrowing of intervertebral foramen.

Osteoarthritis of the cervical vertebrae may exist and be symptomless. However, when a patient complains of pain in the shoulder, in the arm or over the precordium, it is well to keep in mind the fact that this pain may be due to osteoarthritis of the cervical vertebrae. Pathologic conditions of

the heart, cervical rib, Raynaud's disease or periarthritis of the shoulder are conditions to be ruled out. If these do not exist and if roentgenograms of the neck reveal hypertrophic changes in the vertebrae, then we believe that traction is worthy of a trial. If traction relieves the symptoms, it has become a therapeutic test.

Technic

One of us⁷ (F. H. K.) previously wrote of the use of traction, following Hanflig's technic, in the treatment of osteoarthritis of the cervical vertebrae. If the patient is going to obtain relief by the use of traction, this is usually

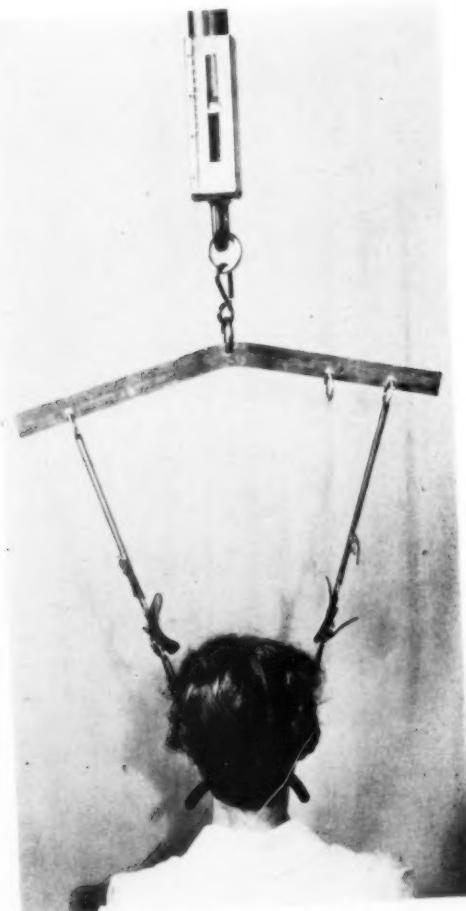


Fig. 1. — Sayre's head sling attached to an ordinary ice scale to register the number of pounds of traction which is being applied.

apparent after three or four treatments, by a lessening of referred pain down the arm or a greater range of pain-free motion in the neck.

We do not follow the exact technic as described by Hanflig,⁸ which consisted of enough traction to swing the patient's buttocks free of a chair. Our impression has been that this would be rather heroic treatment for our patients, as most of them are between 55 and 65 years of age. We prefer to administer radiant heat from a luminous source for thirty minutes, followed by effleurage to the neck and shoulder. Traction of from 70 to 80

pounds (32 to 36 Kg.) is then slowly applied by means of the Sayre head sling. When pull of the desired number of pounds has been reached, the head is rotated gently to the right and then to the left, after which traction is slowly released. If possible, this procedure is carried out twice daily for a week or more, and then the patient is instructed in use of the sling at home.

A scale in the suspension apparatus is an obvious advantage, as we are then able to apply a definite number of pounds of traction and record this

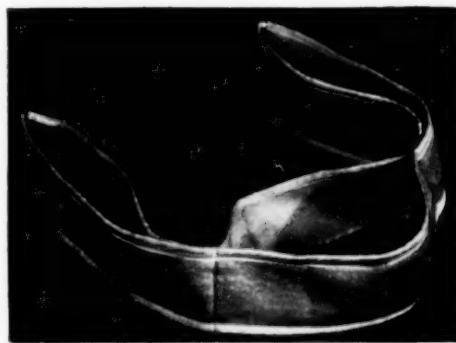


Fig. 2. — Home-made head sling of double thickness of table felt 2 inches (5 cm.) wide. There are three loops. The two outside loops are made by placing a seam 11 inches (28 cm.) from each end, but this distance may vary in order to make the center loop fit snugly over the head.

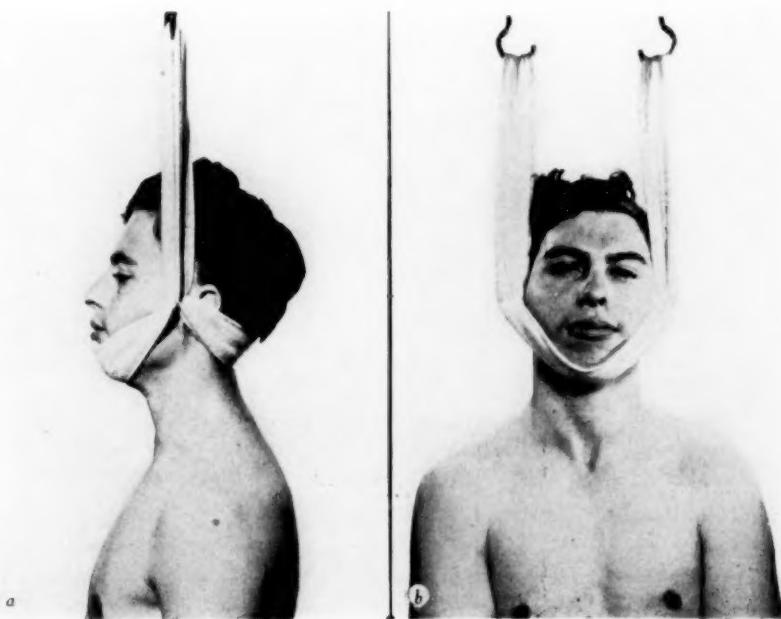


Fig. 3. — Use of a home-made head sling: (a) the center loop of the head sling fits under the chin and occiput; (b) front view of the head sling in use; the two free ends are slipped over the hooks. (Illustration made at White Memorial Hospital, Los Angeles.)

as part of our record (fig. 1). Employment of this scale is also advantageous if it is desired to begin traction at less than 60 pounds (27 Kg.), which may

be necessary for elderly patients, and then to increase traction at each subsequent treatment.

An easily made head sling for use at home is illustrated in figures 2 and 3a and b. The center loop of the head sling is made to slip over the head and fit snugly under the chin and occiput. The two outside loops are fastened to overhead hooks. The patient then flexes the knees just enough to produce strong, firm traction on the neck.

The rationale of this treatment is that if the size of the intervertebral foramen can be increased, it may allow decompression of the inflamed tissues about the nerve roots as they emerge from the spinal column. Nathan demonstrated experimentally that a periradicular exudate exists in the inflamed periosteum of the spinal canal and intervertebral foramen in cases of osteoarthritis.

Results of Roentgenographic Studies

Our interest in what actually happened to the cervical segment of the spinal column when it had 80 pounds (36 Kg.) or more traction on it led us to carry out a series of roentgenographic studies. Figures 4a and b illustrate the effect of 90 pounds (41 Kg.) of traction on the cervical portion of the spinal column of a normal, young adult. The normal cervical curve has

Length of the Cervical Portion of the Spinal Column Before and During Traction with the Head Sling.

Traction Applied Case Lbs.	Group 1 *			Group 2 *			Group 3 *		
	Without Traction Taken Along Spinous Processes	During Traction in cm. in cm.	Results	Without Traction Taken Along Margin of Bodies	During Traction in cm. in cm.	Results	Without Traction Along Anterior Margin of Vertebral Bodies	During Traction in cm. in cm.	Results
Normal Adults									
1..... 90	13.5	14.8	1.3	15.3	16.1	0.8	16.15	16.7	0.55
2..... 100	13.2	14.9	1.7	14.5	16.0	1.5	15.2	15.7	0.5
3..... 90	15.0	16.0	1.0	17.0	18.3	1.3	18.05	19.6	1.5
4..... 75	11.0	12.0	1.0	13.2	13.4	0.2	14.45	14.1	-0.35
5..... 80	14.8	15.2	0.4	15.7	16.0	0.3	16.45	16.6	0.15
6..... 90	12.1	13.8	1.7	15.5	16.15	0.65	17.0	17.2	0.2
Arthritic Patients									
7a.... 80	16.9	17.8	0.9	17.65	18.3	0.65	18.65	19.4	0.75
7b.... 85	13.7	14.5	0.8	15.1	15.6	0.5	16.5	16.7	0.2
8.... 55	8.5	9.2	0.7	12.25	12.4	0.15	14.1	13.8	-0.3
9.... 45	12.75	14.2	1.45	15.2	15.5	0.3	16.95	16.55	-0.4
Average†	1.09	0.65	0.28

* The figures in groups 1, 2 and 3 are the distances in centimeters between two known points of the cervical segment, as explained in the text. The difference in centimeters without traction and during traction is recorded under "Results."

† The three averages at the bottom of the table disclose a general increase in length of the cervical segment. The most significant figure is the average under group 2, of 0.65 cm., for this represents lengthening, or an increase in distance by separation of the vertebrae along their posterior margins, where the intervertebral notches form the foramen.

been straightened and the vertebral notches of each vertebrae separated, thereby presumably increasing the diameter of the intervertebral foramen.

The results of suspension with varying amounts of traction are given in the accompanying table. In order to estimate the amount of separation and lengthening of the cervical segment, we made measurements on lateral roentgenograms of 9 persons before and during traction. Selecting a line across the base of the lowest vertebra visible in the roentgenogram (usually the base of the seventh cervical vertebra) and a line drawn across the top of the atlas or across the base of the occiput and zygomatic process, we took three measurements. One was along the tips of the posterior spinous

processes. These measurements are recorded in group 1 of the table. The second measurement was along the posterior margins of the bodies of the cervical vertebrae and is recorded in group 2. The third measurement was taken along the anterior margins of the vertebral bodies. The measurements are recorded in group 3.

For example, in the case of a normal adult (case 6 in the table), the measurement taken along the tips of the spinous processes was 12.1 cm. before traction was applied; during traction this measurement was 13.8 cm., an increase of 1.7 cm. (fig. 4*a* and *b*). The measurement taken along the posterior margins of the vertebral bodies prior to traction was 15.5 cm., and when traction was applied it became 16.15 cm., an increase of 0.65 cm. The measurement taken along the anterior margins of the vertebral bodies was 17.0 cm. without traction, and during application of traction it became 17.2 cm., an increase of 0.2 cm.

The average increase of the distance measured along the tips of the spinous processes was 1.09 cm. The distance when measured along the

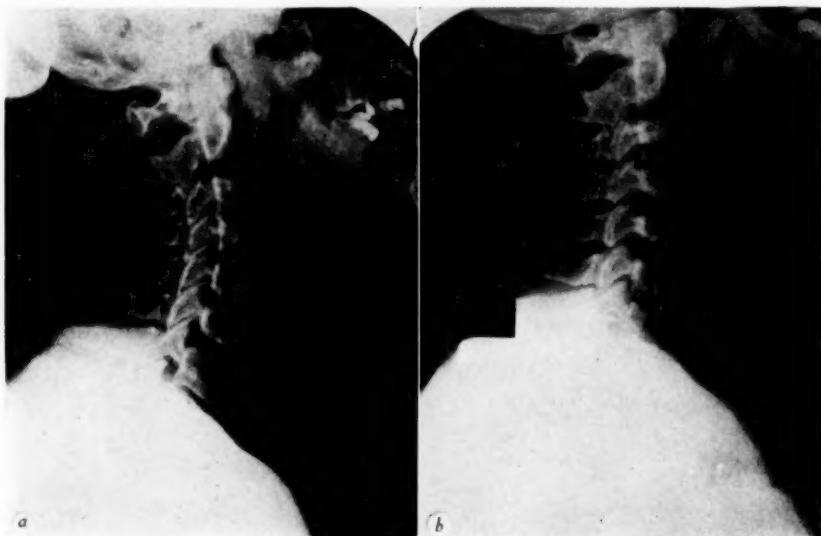


Fig. 4. — Lateral views of the cervical vertebrae: (a) before traction was applied; (b) during application of traction of 90 pounds (41 kg.); the normal cervical curve has been straightened, with resultant separation of vertebrae.

posterior margins of the vertebral bodies increased on the average of 0.65 cm. The measurements taken along the anterior margins of the vertebral bodies gave an average increase in distance of 0.28 cm. The measurements taken along the posterior margins of the vertebral bodies are the most significant, as they represent the amount of separation at the intervertebral notches which form the foramen. In the table these figures are given in group 2. The greatest separation was 1.5 cm. and the least 0.3 cm., with the average at 0.65 cm.

Of special interest are cases 4, 8 and 9. In these, traction caused an increase in length of the cervical segment posteriorly and along the vertebral foramen with a loss anteriorly. Apparently the traction acted somewhat like a wedge, prying the posterior portions of the vertebrae farther apart and bringing the anterior vertebral edges closer together.

Cases 7*a* and *b* in the table represent the same patient, who received several weeks of treatment for cervical osteoarthritis. The amount of separation of the vertebral foramen was essentially unchanged.

Case 9 bears special mention, for this patient had severe osteoarthritis; because of his age, however, only 45 pounds (20 Kg.) of traction was applied. Nevertheless, the distance at the spinous processes and along the posterior margins of the vertebral bodies was increased, the former by 1.45 cm., the latter by 0.3 cm. This man received marked relief from the pain in his shoulder and neck.

In order to demonstrate the enlargement of the foramen in the cervical segment of the spinal column during traction, several three-quarter roentgenographic views were taken. The enlargement of the foramen of a normal young adult when 85 pounds (38.6 Kg.) of traction had been applied is shown in figure 5.



Fig. 5. — Three-quarter view of cervical portion of spinal column to demonstrate vertebral foramen: (a) before traction was applied; (b) during application of 85 pounds (38 kg.) of traction; the cervical curve has been straightened, and the size of the foramen at the level of the fifth to the seventh vertebrae has been increased. (Roentgenograms made at White Memorial Hospital, Los Angeles.)

The cervical curve has been straightened and the size of the foramen from the third to the seventh cervical vertebrae has increased appreciably. The average increase in distance between the vertebral arches of these foramen was 0.15 cm.

We are well aware that these figures cannot be considered absolute and that many variables were present. Our interest in this problem was stimulated by a desire to know what happened to the cervical vertebrae when traction was applied by the Sayre head sling. We wanted to know if the use of traction separated the vertebrae and the vertebral notches and thus increased the size of the vertebral foramen. From this standpoint the results are significant, for among normal persons and among those who had osteoarthritis, definite measurable increases in distance between the cervical vertebrae were demonstrated, and a consequent increase in size of the intervertebral foramen occurred. In general, it can be noted that the greater the traction, the greater the degree of separation occurring in the cervical segment.

Comment and Summary

We have had no serious complications arising from suspension of patients by the method described. When the pain was made worse, naturally further traction was not applied.

We consider use of the Sayre head sling or some other form of traction a valuable adjunct in treating radiculitis associated with osteoarthritis of the cervical segment of the spinal column. We do not consider that it should be used in every case in which hypertrophic changes in the cervical segment of the spinal column can be demonstrated, but rather that its use should be limited to cases in which definite evidence of involvement of the radicular roots of spinal nerves with hypertrophic changes is demonstrated and in which as far as possible all other causes have been ruled out.

Hypertrophic changes from primary osteoarthritis in the cervical segment frequently cause radicular pain referred to the shoulder, arm or precordium. These symptoms often can be relieved by traction. Roentgenographic studies demonstrate that traction causes a separation of the cervical vertebrae with a tendency to straightening of the normal cervical curve and that along with this separation there is an increase in diameter of the intervertebral foramen.

References

1. Sayre, L. A.: Spinal Disease and Spinal Curvature, Their Treatment by Suspension and the Use of the Plaster of Paris Bandage, Philadelphia, J. B. Lippincott & Co., 1877, pp. 121.
2. Nachlas, I. W.: Pseudo-Angina Pectoris Originating in the Cervical Spine, *J. A. M. A.* **103**:323 (Aug. 4) 1934.
3. Parker, H. L., and Adson, A. W.: Compression of the Spinal Cord and Its Roots by Hypertrophic Osteoarthritis, *Surg., Gynec. & Obst.* **41**:1 (July) 1925.
4. Morton, S. A.: Localized Hypertrophic Changes in the Cervical Spine With Compression of the Spinal Cord or of Its Roots, *J. Bone & Joint Surg. n. s.* **18**:893 (Oct.) 1936.
5. Hubeny, M. J.: Radiculitis, *Radiol.* **20**:331 (May) 1933.
6. Turner, E. L., and Oppenheimer, Albert: A Common Lesion of the Cervical Spine Responsible for Segmental Neuritis, *Ann. Int. Med.* **10**:427 (Oct.) 1936.
7. Krusen, F. H.: Backache: The Relation of Physical Therapy to Its Management, *Canad. M. A. J.* **42**:534 (June) 1940.
8. Hanflig, S. S.: Pain in the Shoulder, Girdle, Arm and Precordium Due to Cervical Arthritis, *J. A. M. A.* **106**:523 (Feb. 15) 1936.
9. Nathan, P. W.: The Neurological Conditions Associated With Polyarthritis and Spondilitis, *Am. J. M. Sc.* **152**:667 (Nov.) 1916.



REHABILITATION OF PATIENTS WITH PSYCHOLOGI- CALLY PROTRACTED CONVALESCENCE *

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The psychiatrist is not consulted about the patient who returns to work after his recovery from an industrial injury. His attention is called to those patients whose convalescence is protracted for psychologic reasons. It is not within the scope of this paper to classify the behavior observed during the protracted convalescence in diagnostic terminology, but rather to describe the psychologic reactions that occur from the moment a worker is injured until he returns to work. For the purpose of developing a psychiatric management leading to rehabilitation, I believe that emphasis should be put on psychologic reactions rather than on diagnosis; hence the term psychologically protracted convalescence. I will not include the problems of the industrial psychotic patient or the patient with coexisting physical illness.

The industrial physician, aware of compensation laws and legal implications, in many instances has been trained to evaluate only objective findings. He listens to the recital of the subjective complaints, but in court he has been told that for medicolegal purposes he cannot take into consideration subjective symptoms; so he places undue stress on the objective findings, for which he seeks an actual pathologic basis. When the subjective or objective symptoms cannot be determined to be the result of disease or injury, he attempts to decide whether the patient is malingering or has a psychoneurosis. He is reluctant to make a diagnosis of psychoneurosis in the State of Illinois because obsolescent supreme court decisions gave the term "traumatic neurosis" a sinister meaning—a condition indicating total and complete disability. Any psychiatrist in private practice knows that this is not true, that most persons suffering from psychoneuroses have a high degree of work efficiency. For this reason only the most severe of the behavior disorders are recognized as psychoneuroses, and even with these, often the symptom, not the person, is treated; so sooner or later the physician, discouraged by the patient's lack of therapeutic response, regards him as untreatable.

If the physician decides that the patient is feigning or shamming, that his simulation is conscious or deliberate, he recommends that the patient be discharged from further compensation and medical care and that he return to his work. In most instances he does not anticipate that his attempted disciplinary action will immediately rehabilitate his patient. He senses that the patient is hostile, that he has a negative therapeutic attitude and that further medical care only serves to justify the patient's behavior without curing it. He has learned by experience that his discharge of the patient will set into action a series of medicolegal events that, as in the State of Illinois, will terminate either in a lump sum settlement, in a determination of continued disability payments or in the relinquishment of the responsibility of the employer to the injured workman. The entire procedure is

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reduced to a matter of a bargaining transaction. The patient is thought of as an individual who is hostile to the representatives of his employers. They in turn are defensive against his supposed attack. His presenting symptoms are regarded not as the complaints of a sick man but as the arguments for justification of a claim. They are often evaluated remuneratively, not in terms of the degree of disability which is believed to exist, but in relation to the aggressive, convincing manner in which they are presented.

Within this industrial scene the lump sum settlement and the relinquishment of the responsibility of the employer to the workman are, ironically in some cases, methods of rehabilitation, while the continuation of disability payments in psychologically protracted convalescence delays the return to work. In such instances the continuing disability payment is symbolic parentalistic support. Private practice of psychiatry offers many examples of dependence in which the presence of the parentalistic figure makes the reassumption of responsibility almost impossible. Instances are the indolent adult son of an overindulgent father or an overprotecting mother and the nonworking husband of a supporting wife. These patients make plans and promises to go to work, but one rationalization or another prolongs the procrastination. It is a human trait to want to take things easy, to drop everything and take a long rest. The continuing disability payments in psychologically protracted convalescence encourage a satisfaction of this biologic urge. The alternative, a lump sum settlement, as if surgically, removes the parentalistic figure. However, paradoxically, the anticipation of this lump sum settlement often motivates the development of a protracted convalescence.

Large sums of money are spent each year for lump sum settlements when a diagnosis of traumatic neurosis has been made. I raise the question as to whether a much smaller sum of money could not be spent on a method of rehabilitation more psychiatrically sound both for the patient and for society as a whole. In this paper I shall propose such a method. What I have to offer is nothing new. It is an application of psychoanalytic psychiatry and the principles of psychotherapy to industrial practice of psychiatry and the further utilization of such ideas on occupational therapy as have been developed in Dr. Coulter's Occupational and Physical Therapy Department at St. Luke's Hospital, Chicago. The method has four major divisions:

1. Psychologic understanding of the patient's character, in order to avoid emotional trauma to his personality during all his professional and industrial contacts.
2. Psychiatric evaluation of the patient's emotional problems, both related and collateral to his accident, in order to clarify the dynamic meaning of his attitudes and make him understand his own behavior.
3. Careful supervision of all the psychologic aspects of his return to employment, so as to avoid maladjustment and if possible improve his previous work adjustment.
4. Instituting, at the first evidence of psychologically protracted convalescence, of a recreation and exercise therapy program supervised by psychiatrically trained physical directors.

A detailed explanation of the four divisions of this psychiatric approach to rehabilitation follows:

1. *Understanding the Character or Personality of the Patient.* — It is possible for the physician untrained in psychiatry to gain sufficient skill in understanding the character of his patients so as not to confuse a character trait with a symptom, not to be angered by the patient's aggressions, not to aggravate the patient's hostility and not to foster dependent drives.

Because industrial patients have their physicians assigned to them, the usual patient-doctor relationship is not present. This requires that the physician be able to recognize personality types in order to gain their confidence and not be irritated by them. Examples of personality types frequently seen with psychologically protracted convalescences are:

1. Persons who are excessively defensive against being taken advantage of; who react to coercion or aggressive persuasion with panic or anger; who react to authoritative comments with disputing, fault finding, argumentative and even intimidating attitudes; who must convince the interviewer at any cost that they are in the right, that what they present must be taken at its face value, and who in extreme cases become litigating paranoids, who discharge their attorneys and prepare their own cases.
2. Persons with deep-seated feelings of insecurity, whose outward behavior is aggressively competitive; who react to the threat of a permanent disability with fear and often with pleadings to leave the hospital, and who, should they unwisely be allowed to do so, react to the bad effects, on the one hand, with depression, hopelessness and despair, and, on the other hand, with hostility toward those on whom they are dependent.
3. Persons, most often women, who are excessively dependent; who demand attention, consideration and tenderness; who present complaints for satisfaction of these demands; who are grateful and cooperative to those who accept them as their charge and hostile and spiteful to those who frustrate their wishes.
4. Persons who since childhood have felt rejected, not loved, not respected; who react to slights, abrupt attitudes, criticisms, neglect and implications of dishonesty, with petulance, pouting, depression, or overt anger and spite, and who react to friendly, cordial, interested attitudes with co-operation.
5. Persons whose achievement motivation is dependent on the gratification of desires for praise and admiration from their superiors; who go to great length to get this praise, even to the extent of making themselves unpopular with their fellow employees, and who react with tension to criticism and disapproval, thereby losing their initiative and incentive for co-operation.
6. Persons with hysterical characters who exhibitionistically draw attention to their plight by dramatically portraying their suffering and who are hypersuggestible and autosuggestible so that, on one hand, they react to the inferences of the neurologic examination with the production of symptoms and, on the other hand, provide easy detection of such symptoms when these are investigated by methods involving the use of suggestion.
7. The martyr, "who sticks out his neck for trouble" and who accepts the vicissitudes and deprivations of his disability without motivation to improve his condition, and in whom one may sense hidden, hostile, spiteful feelings in the exhibition of the prolongation of his suffering.
8. The hypochondriac personality, who presents his subjective symptoms in an obsessive manner not unlike a somatic delusion; who demands repeated investigation and treatment of his complaints, and who may be anticipated not to acknowledge recovery but instead to insist that the treatment made him worse.
9. The psychopathic personality who is shiftless, dishonest, unreliable, undependable; who is given to alcoholism and ne'er-do-well activities.
10. The person approaching senescence with a feeling of economic, occupational and health insecurity, who reacts to the accident with intensification of that insecurity.

Description of the personality types emphasizes the need for the adaptive management on the part of the physician.

2. *Evaluation of the Patient's Emotional Problems.* —

1. Problems related to the accident: Psychoneurotic reactions may appear when the patient has been injured in an accident terrifying him. Examples of such accidents are hold-up injuries, particularly in a person who does not like to fight; mechanical injuries in which the patient is pulled by the hair or the clothes into a rotary machine; entrapment in a closed space in the presence of a threat to life, and heat and explosion injuries. The presence of consciousness during the accident and the absence of amnesia contribute to the development of the fright neurosis.

The essential feature of this reaction is a constant tendency to relive, often with increasing distortions, the frightening aspects of the accident, as in dreams and in conversation. With the retelling, early in the convalescence, the patient often re-experiences the emotions of the accident. Often deep-seated feelings of insecurity are activated by such accidents, so that in addition to recognizing these, the physician and the employer must be more than usually considerate with the patient and must see to it that he is offered a replacement at work that obviates a recollection of the accident scene.

2. Emotional problems collateral to the accident: It has been loosely assumed by some that the actual injury to the body caused behavior disturbances such as those under consideration through setting into action a series of physiologic processes. Experience in industrial psychiatry indicates the contrary to be true, that the emotional reactions related to the accident, and to circumstances collateral to the accident, determine, in a given personality, the character of the protracted convalescence. Many patients are involved at the time of the accident in emotional problems for which they have only a conflictual solution. After the accident, often a minor one, these persons manifest one personality disorder or another that results in a protracted convalescence which is a conscious or unwitting solution of their conflict. The character of the symptoms depends on the personality of the patient, the lability of function of his nervous system and the character of the conflict. It is not within the scope of this paper to describe these reactions but to put emphasis on their causation so that these facts may be taken into consideration in planning and encouraging rehabilitation for a given patient.

A few examples of the more common collateral emotional problems follow: conditions, because he fears that he will be laid off when he returns to work. He may be angry at his employer because of a reduction in salary, because he feels he has been unfairly treated, because he is dissatisfied with working conditions, because he fears that he will be laid off when he returns to work or because he feels he had been cheated in a previous medicolegal claim. The patient may have been employed at an occupation contrary to his temperament or training, such as a "white collar" man working as a laborer; a college graduate in engineering working under less skilled superiors; an ambitious, aggressive skilled worker forced to accept an inferior position, where a return to work means a return to frustration, dissatisfaction and discontent. This is also true of those who have been making a poor social adjustment at work.

2. The accident may intervene while the patient is struggling to solve a bad marriage adjustment. Then the motivation to return to work and assume the responsibility of the family is often poorly developed. Instead, there may be attitudes of anger, defiance or spite toward the spouse, who may in turn retaliate with attitudes of resentment and irritation. These hostile emotions may be prominent when the wife has been aggressive and dominant and the patient is getting for the first time an opportunity through illness to "get the

upper hand." In the presence of separation or divorce the protracted convalescence provides for revengeful avoidance of payment of alimony or for bids for sympathy. On the other hand, often a marriage which has been stormy and competitive prior to the accident becomes a scene of contentment in the presence of excessive dependence on the wife, who assumes an overmaternalistic and protective role toward her husband (projecting her own hostility toward him on to his employers and defending him against them). However, the dependence of the psychologically protracted convalescence is not always so readily accepted by the wife. She may show contemptuous and depreciating attitudes toward him which usually increases the tension of the patient and further protracts the convalescence. During these dependent states the patient becomes easily annoyed by his children, now his sibling rivals, and may become acutely anxious if a baby is born to his wife.

3. When the patient has not reached heterosexual maturity, a protracted convalescence may offer further deferment of a contemplated but feared marriage adjustment and encourage continued dependence on a relative. On the other hand, patients who have been for years conflictually attached in a dependent way to a mother or sister become easily frustrated or angrily defensive as the protracted convalescence encourages further helplessness.

4. Mothers and older sisters who have assumed responsibility for years with a great deal of self sacrifice, find in the protracted convalescence opportunity for a long-earned rest, in the presence, however, of guilty feelings and frustration that further complicate the convalescence.

5. Economic reverses, death of an emotionally important relative or marriage of a supporting son or daughter during a convalescence produce feelings of insecurity that further protract the convalescence.

When the physician has gained skill in recognizing the dynamics of patient's behavior, he can enable the patient at least to understand that there is a relationship between his problem and his suffering. This insight in itself is a forward step in rehabilitation.

3. *Psychologic Problems in the Return to Employment.* — When observations have determined that the convalescence has been psychologically protracted, the personnel director must carefully supervise the return to employment. He must recognize that the patient returns to work reluctantly for reasons I have already given and that he will likely be unduly sensitive to slights, neglect and criticism. Whenever possible his work adjustment should be improved, as by special placement in a position to his liking. Respect should be paid to the patient's possible residual subjective complaints or to actual partial disabilities in the selection of his occupation. However, it is well known that many patients, who during a psychologically protracted convalescence protest that they wish to be returned to work, seek only an opportunity to prove that they are unable to do so. While the employer should not be unsympathetic he should avoid overpaternalistic attitudes, which encourage rather than curtail such behavior.

4. *Recreation and Exercise Therapy.* — While not infrequently it is possible to rehabilitate a patient from a psychologically protracted convalescence with psychotherapeutic interviews alone, the average patient will require additional therapy. Many of these patients are angry, they feel they have been "pushed around," their complaints have been challenged, their repeated requests for treatment have been met with repeated examinations, and for the most part society has not been too kind to them. At best, their behavior because of its conflictual nature and psychologic defenses leads to continued frustration. They may have developed an undue dependence on, or zealous possessiveness of, a no longer needed brace, crutch or cane. To part with this was to give up a

precious exhibitionistic justification of the alleged disability. Their long period of relative inactivity and tension has usually left them weak and flabby, with bad hygienic habits and poor morale. Their philosophy of life was directed toward the establishment of a protracted disability instead of growth, health and achievement. It has been my experience that because of the frustrations involved in such behavior these patients will cooperate in a treatment which offers them diversion, recreation and play, good body development and amiable companionship, even if the acceptance of that treatment denies the further existence of the convalescence.

The Method

For the past thirteen years,¹ I have used the full facilities of a well equipped gymnasium, such as the Lawson Y. M. C. A., for this treatment. Best results were obtained with nonresidents of Chicago who lived at the Lawson Y. M. C. A., this fact confirming a usual psychiatric observation that patients more readily recover away from the influences contributing to their behavior. The luxurious atmosphere of this particular institution is far above the average standard of living of the workmen I have treated. This enables the employer to be seen as one who is generous rather than one who takes and deprives. The patient is carefully instructed in the indications for and the nature of the treatment. His cooperation will depend on his confidence in the assisting therapist as well as in the physician. An athletic companion is selected who must be skilled in sports, a leader, decisive, resourceful, tolerant, sympathetic to the patient's resistant behavior, interested in a therapeutic result, able to comprehend a psychologic explanation and to follow orders. He should be able to motivate the patient by gaining his confidence; maintaining control of the situation at all times; be able to engage in competitive games, winning or losing at will; be able to teach the patient athletic skills and to show enthusiasm and gratification at the patient's successful performance. On sight-seeing excursions, on long walks in the parks, on visiting places of interest and amusement, he should be friendly, companionable and appropriately enthusiastic.

The patient should be introduced to the regimen with emphasis on play and recreation. As soon as he develops skill in a given sport, he should engage in competitive games. The companion should play the game as fast as the patient's physical condition and ability permit. If the patient favors the right arm, the companion, as in the game of badminton, should direct the play toward that extremity without making this apparent and also avoiding pressure of this type if the patient is angered. The periods of activity should be short at first and later increased, with rest taken at the first sign of fatigue or physical complaint. The patient should not be coerced into activity. The companion should accept the patient's complaints at their face value. The patient should be forewarned of the usual exercise muscle soreness, concerning which he will usually make an "ado." The exercises on the stationary bicycle, rowing machine, mat and pulleys are added later. The patient will not accept these as readily as exercises involving the pleasure of the game. To him these are tests.

The companion should intelligently present these activities as muscle-training exercises, beginning with muscles not involved in the patient's complaints. Controversies over whether a patient can exhibit a given muscular function should not be engaged in. Inconsistencies in performance noted between recreative and purely exercise activities should not be called to the patient's attention by the companion. Many patients at first suspiciously regard the treatment as a test of their ability to return to work. Swimming will be found to be a favorite

sport. Massage or heat therapy may follow the workouts to advantage, and early in the treatment, rest in bed. The evenings should be devoted to supervised amusement and entertainment.

The physician should see the patient at his office for psychotherapeutic interviews, the purpose of which is to encourage the patient through friendly understanding, and if possible psychologic understanding, to engage in more and more activities. As the patient begins to enjoy the regimen and notes the general increase of bodily health, he will cooperate to the point of recovery. About six weeks is the average duration of treatment necessary to rehabilitate the patient. Some patients will use the gymnasium as a scene for indicating the alleged grave nature of their disability. These patients may be refractory to this therapy or require a much longer time to treat.

It is my recommendation that private capital or the government equip a large gymnasium for competitive sports, swimming, occupational and physical therapy, staffed by psychiatrically trained physical directors and occupational-and physical therapy technicians.

Conclusion

The problem of rehabilitation is a psychiatric one. Just as Freud acquired an understanding of human behavior through the study of the psychoneurotic patient, a study of psychologically protracted convalescence offers a contribution to the understanding of the total problem of rehabilitation.

Reference

1. Solomon, A. P.: Problems in Diagnosis and Treatment of Post-traumatic Syndromes Not Based on Organic Pathology, *M. Clin. North America* **14**:1281 (March) 1931.

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REMOVAL OF SUPERFLUOUS HAIR WITH THE CUTTING CURRENT

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In 1924 Bordier¹ recommended diathermy as a new form of treatment for hypertrichosis. He used the conventional, or long wave, spark gap diathermy machine,² which has a frequency of 1 to 3 million cycles per second, a current that is intermittent, damped or irregular and a wavelength that is not constant. Epilation with this type of diathermy apparatus has been slow to become popular, because most spark gap units, until recently,³ were made for high intensity current and were difficult to adjust and control for this kind of treatment.

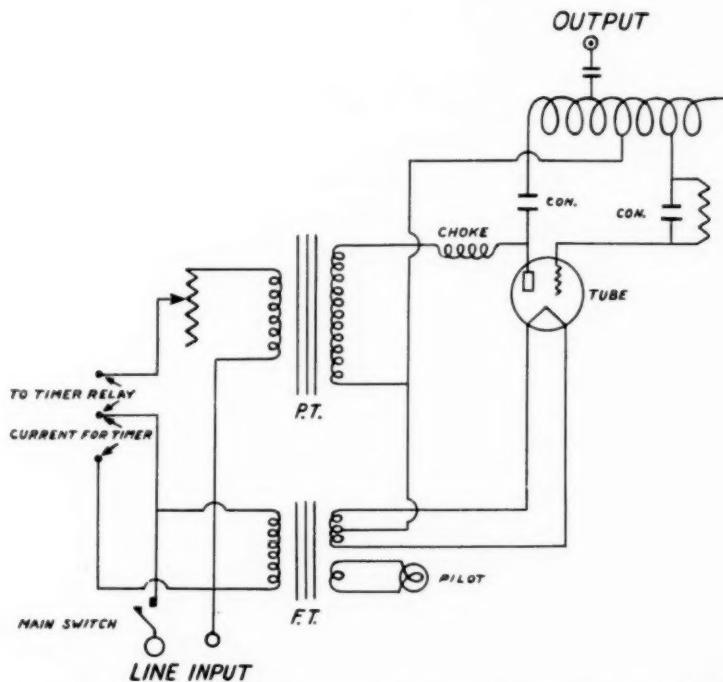


Fig. 1.—Vacuum tube hook-up for removal of superfluous hair with the cutting current.

In the past decade there has been a continuously increasing interest in short wave diathermy for epilation.⁴ For this method a vacuum tube diathermy apparatus having an oscillating circuit producing 10 million cycles a second and operating on approximately 40 meters is employed. This type of apparatus generates a sustained undamped current which flows smoothly in equal wave trains and produces such high oscillations that the mono-terminal method⁵ may be employed for epilation. The terminal current taken from the oscillating coil (see accompanying illustration) has the correct voltage and milliamperage to destroy a hair papilla in one twentieth of a second.

However, the intensity and rapidity of the oscillating current from the vacuum tube diathermy machine is so high that damage to the contiguous tissue will ensue unless the time of exposure is strictly regulated by an automatic electronic timer.

A preliminary presentation and discussion of this method is warranted by the satisfactory results obtained.

High Frequency Unit

The power supply in this machine consists of a "step-down" transformer (*F. T.*) providing a low voltage alternating current to heat the filament in the vacuum tube and a "step-up" transformer (*P. T.*) which is applied between the plate and the filament. It is the function of the step-up transformer to supply high unidirectional current voltage to draw electrons from the filament to the plate.

The oscillator circuit consists of a thermionic vacuum tube connected in an appropriate circuit of inductance and capacities, as shown in the illustration. The oscillating unit is coupled with an automatic electronic timer which consists of three vacuum tubes and two automatic relays. The timer may be set to regulate and limit the length of time that the high frequency current is on to either one-twentieth or one-tenth of a second. The master control on the calibrated dial controls the intensity of the current and must be adjusted according to the type of hair to be destroyed. A blocking condenser placed in series in the terminal current eliminates any stray current and acts as a protection for the patient. The operator closes the circuit by stepping on the foot switch, allowing the oscillating current to energize the needle, thus leaving both hands free for the insertion of the needle and the removal of the hair.

A separate outlet and a separate foot switch are provided which eliminate the automatic timer and permit the machine to be used for coagulation and cutting in the destruction of skin lesions.

Technic

The vacuum tube diathermy machine transmits sufficient energy to permit employment of the monoterminal method. The terminal of the unit is connected to the needle holder by a fine flexible insulated wire. The choice of the needle is of great importance. We use a fine straight steel needle with an oval bulbous tip. Some dermatologists recommend the use of a needle insulated except at the tip. An insulated needle, however, is too thick to slide along a fine hair follicle, the coating cracks easily and the cutting current often passes through the insulation. Platinum needles have been used in electrolysis in order to avoid tattooing, but are not required in this method, since no electrolytic action takes place and there is no possibility of confusing poles.

The needle is inserted into the mouth of the hair follicle until a slight resistance is felt as the neck of the follicle is reached. By the weight of the needle holder the needle is permitted to slide into the body of the hair follicle for about 3 or 4 mm., until resistance is felt at the tip of the needle as it reaches the papilla. By stepping on the foot switch, the operator now closes the circuit, allowing the flow of the oscillating current to the needle. The automatic timer then shuts off the current in one-twentieth of a second.

From an initial low intensity, the current is gradually increased by a master control in order to establish the proper threshold of current required to destroy the hair follicle in one-twentieth of a second. The thinner the needle the less current required to produce the amount of heat needed for

the destruction of the hair follicle.⁶ The greatest amount of heat is concentrated at the point of the needle. It is, therefore, of utmost importance that the needle be inserted deep enough to reach the papilla. Keeping the energized needle in the mouth of the hair follicle or in the upper part of the skin will lead to visible scarring and frequently to regrowth of hair.

Summary

The advantages of this method of treatment are evident. The automatic electronic timer makes possible the safe and facile use of high intensity cutting current in the treatment of superfluous hair. An exposure of one-twentieth of a second of this current is sufficient to destroy the hair papilla. The speed permits the removal of a far greater number of hairs than that removed by any other method. The short exposure also minimizes sensation of pain. Tatooing, or excessive pigmentation, is eliminated because no electrolytic action takes place in the skin. The cutting current greatly reduces the possibility of scarring, because tissue destruction occurs much closer to the energized needle than in diathermy coagulation. With this method regrowth of hair is practically negligible, and because damage to contiguous cells is minimized the cosmetic result is excellent.

References

1. Bordier, H.: Nouveau traitement de l'hypertrichose par la diathermie, *Vie méd.* **5**:561, 1924.
2. Saalfeld, E.: Zur Hypertrichosisbehandlung, *Dermat. Wehnschr.* **81**:1565, 1925; Rosenberg, A.: Epilation with Diathermy: A Preliminary Report, *M. J. & Rec.* **121**:751, 1925; Eitner, E.: Hypertrichosisbehandlung mittels Elektrokoagulation, *Wien. klin. Wehnschr.* **40**:460 (April 7) 1927; Palvarini, A.: La diathermocoagulation en dermatologie, *Arch d'électric. méd.* **36**:76 (Feb.) 1926; Langer, E.: Electrocoagulation in Dermatology, *Beihefte z. Med. Klin. (no. 6)* **23**:165, 1927; Fenyö, J.: Diathermy for Cosmetic Purposes, *Zentralbl. f. Hautu Geschlechtskr.* **25**:551, 1928; Lanári, E. L.: Feminine Hypertrichosis: Therapy by Diathermocoagulation, *Semana méd.* **2**:1845 (Dec. 31) 1936.
3. Karp, Florentine L.: High Frequency Current in the Treatment of Hypertrichosis, *Arch. Dermat. & Syph.* **43**:85 (Jan.) 1941.
4. Derow, D.: Short Wave Epilation, *Arch. Phys. Therapy* **20**:101 (Feb.) 1939; Lanzi, G.: Marconitherapy of Hypertrichosis in Women, *Policlinico (sez. prat.)* **44**:1732 (Sept. 13) 1937.
5. Brown, Marthe Erdos: Superfluous Hair Removal with the Monopolar Diathermy Needle, *Arch. Dermat. & Syph.* **46**:496 (Oct.) 1942.
6. Bordier, H.: Diathermie et diathermothérapie, ed. 6, Paris, J. B. Baillière et fils, 1931, pp. 229-233; Giraudeau, R.: Le problème moderne de l'épilation, *Arch. derm.-syph. Clin. St. Louis* **4**:223, 1932.

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MOTOR NERVE INJURY

A Review of Physiologic Literature

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The following review concerns itself mainly with observations on experimental animals—dogs, cats, rabbits and even lower species. Although the reactions of nerve tissue to injury in such animals may be quite different quantitatively, no important qualitative differences from human tissues are to be expected. Certain conclusions as to human physiology and pathology are justified. Their present importance does not need to be emphasized.

The functional unit of the motor nerve must necessarily include its anterior horn cells and its effector organ, the muscle. Apparently the reactions and changes of the ganglion cells are of little importance in peripheral nerve injuries. The peripheral part of the unit can conveniently be subdivided into three sections: The first, the nerve fiber, carries central impulses to the second, the neuromic end organ (synapse, end plate or neuromyal junction). The synapse transmits by release of a chemical mediator, acetylcholine,¹ impulses to the third, the muscle cells and fibers. These contract, probably as a result of physical changes set up by acetylcholine. Acetylcholine is immediately destroyed by an esterase, and the muscle fiber returns to its previous state. Rapid volleys of discharges carried through nerve fibers and transmitted by the end plates result in the normal tetanic contraction of striated muscle. Motor nerve fibers are of high conductivity if they are relatively thick, with a well developed myelin sheath (A fibers), or they carry impulses more slowly if they are thin and poorly myelinated (C fibers).

Results of Peripheral Nerve Injury

1. *On the Motor Nerve Fibers.*—Anatomically the peripheral stump of a sectioned nerve develops the signs of wallerian degeneration. Within twenty-four hours the myelin sheath shows fragmentation. By the end of the second week much of it has been absorbed by phagocytes, and within two months it disappears entirely. During the first days the axon takes on a varicose appearance and is then gradually absorbed. Schwann's cells enlarge, develop an increased number of nuclei and form within twenty-four to thirty-six hours a protoplasmatic tube to receive the ingrowing new axons. Three hours after section, buds and branches appear on the fibers of the central stump, and they enter the scar by the end of the second day.² The peripheral part of the nerve becomes increasingly edematous during the first few days, and by the fourth day its weight is 30 per cent greater than normal.³

Functional changes in the peripheral part of a sectioned nerve are first to appear and are most intensive closest to the injury, progressing from there distally. Chronaxie remains unchanged for at least four days, but the rheobase is usually increased within forty-eight hours, indicating a diminished excitability. Later, the chronaxie increases to ten to one hundred times the normal value.⁴ Gradually, excitability to faradic and galvanic stimulation disappears. The electric discharges of the nerve fibers following their electric stimulation, the spike potentials, begin to decrease on the third day after section and amount to about one-fourth normal eighty to one hundred

hours after the injury. The conduction velocity of the fibers is greater than normal during the first two days after trauma and becomes less than normal after three days. On repetitive stimulation with frequencies of sixty to one hundred twenty per second, the responses of the sectioned nerve are during the first two days sometimes better sustained in magnitude and velocity than normal. Thereafter, abnormal fatigability develops, especially on protracted stimulation at the higher rates. The fast A fibers exhibit functional degenerative signs sooner than the slow C fibers. These changes are partly explained by the shunting effect of edema and the lowering of resistance in the fragmented myelin sheaths.³

A normal motor nerve contains a certain amount of acetylcholine. It discharges acetylcholine during stimulation, and the amount is diminished after repetitive stimulation. During recovery the acetylcholine content increases again, even above the previous level. In a degenerating nerve the acetylcholine content is diminished forty-eight hours after section, and it does not increase after repetitive stimulation.³ The physiologic significance of these observations is not clear yet. As a whole the functional changes in the motor nerve in the early stages of degeneration are mild or even negligible.

2. *On the End Plate.* — This is the first structure within the muscle to show anatomic changes after denervation. Nuclei close to the disintegrating nerve fibers disappear; others increase in number. Later, the whole end plates vanish.⁴ Functional changes are early and of great importance. Single shocks applied to the motor nerve produce a normal response in the muscle during the first forty-eight hours after nerve section. Then the twitches become smaller, and after eighty hours or more single shocks from the sectioned nerve are without effect.⁵

On continuous repetitive stimulation a normal nerve-muscle will show the so-called five stages of transmission in successive periods. The first three stages are best brought out with high frequencies of about four hundred per second. During the first and third stages a contraction of maximum tension is produced; during the second stage the tension is diminished because the end plate accumulates enough acetylcholine on such rapid stimulation to have a depressing effect.¹ This second stage of transmission is diminished as early as twenty-four hours after nerve section and disappears after forty-eight hours.⁵

The fourth and fifth stages of transmission on a normal nerve-muscle are best obtained with continuous stimulation at a rate of forty to sixty per second. During the fourth stage the tension is greatly reduced, a sign of fatigue. While stimulation is continued, tension rises again and fatigue disappears spontaneously with the onset of the fifth stage. Fatigue during the fourth stage is the result of a diminished acetylcholine production in the synapse, and the recovery during the fifth stage is caused by an increase of the acetylcholine output.¹⁻⁶ Thirty hours or more after nerve section the fifth stage ceases to appear. The fourth stage—transmission fatigue—occurs sooner than normal and is more intensive. A brief period of rest will produce complete recovery from transmission fatigue under normal conditions, while it needs a prolonged rest to accomplish a slow and incomplete recovery thirty to forty hours after nerve section.⁵

Transmission of motor nerve impulses at the synapse fails therefore after nerve section sooner than conduction in the nerve fibers. This failure of transmission is probably due to a lack of or deficient liberation of acetylcholine. Another well known disease caused by failure of transmission is myasthenia gravis.

Cholinesterase, which destroys acetylcholine, has been found increased in the muscle—probably localized around the nerve endings—early after nerve section.^{7,8} This may have an additional influence on the development of transmission deficiencies.

While the denervated synapse fails to function properly it develops a lowered threshold to a number of stimuli. The muscle becomes abnormally sensitive to intra-arterially injected acetylcholine and to potassium, nicotine, physostigmine and other stimuli.³

3. *On the Muscle Fibers Proper.* — Here the first anatomic changes to appear after nerve section are those of atrophy. A gross loss of weight starts on the third day and may gradually progress to about eighty per cent of the initial weight. Red muscle loses color, and white muscle becomes pink-red. Changes in the subsarcolemmal nuclei are reported as early as the second day after denervation. Sarcoplasma and myofibrillar substance are involved later. Striation is maintained for a long time, until the signs of degeneration appear. There may be hyalinization, vacuolization and disintegration of fibers. The whole process ends up in the substitution of muscle tissue by fibrous scar tissue.⁴

Although some observers found acute functional changes in the muscle immediately after denervation, the first signs were generally obtained one to two weeks after denervation. In addition to the above described failures of transmission there develops a peculiar type of contraction on different stimuli, direct electric muscle stimulation, mechanical excitation or the injection of contractor substances. There is the normal fast twitch first, but it is followed by a slow contraction of long duration.⁴ Later on the twitch fails to appear, and only the slow response is obtainable. The slow response is similar to the contracture caused in a normal muscle by intra-arterial injection of an overdose of acetylcholine. Observations on the electric activity of the denervated muscle during slow contractions are not unequivocal. The slow response survives denervation a long time. Cases in human beings are reported in which contraction on electric stimulation of a muscle was obtained thirteen to twenty-three years after its nerve had been severed.⁴

A second characteristic phenomenon in the denervated muscle is fibrillations. These are visible only on the exposed muscle, not through the skin. They are possibly not quite identical with the coarser fibrillations visible through the skin in anterior horn disease. Fibrillation begins on the third to fifth day after nerve section and is maintained for a long time, possibly as long as there is contractile tissue. It consists most probably of the contractions of parts of single fibers, which does not cause a change in the shape or tension of the whole muscle. Fibrillations are connected with small electric discharges at the rate of two to nine per second.⁴

Studies of chronaxie of denervated muscle in experimental animals are difficult to evaluate for a number of reasons. Similar studies on humans are still more obscure, although they may well be of clinical value. Obviously muscle chronaxie increases relatively late after denervation. The well known features of the reaction of degeneration can be at least partly explained by the above reported functional changes of the motor nerve, the synapse and the muscle fiber.

Six to eight weeks after nerve section the muscle begins to change its tone; it shows increasingly the signs of contracture unless this is prevented by artificial measures or by gravity. Contracture is not released by general anesthesia or after death.⁴

Simultaneously with the described functional alterations the denervated

muscle undergoes chemical changes. Their onset seems to be related to the appearance of fibrillations. Most prominent is the loss of energy store materials, such as phosphocreatine and glycogen.¹⁰⁻¹¹ There may or may not be found an increase in their breakdown products, phosphoric acid, creatine and lactic acid. Adenophosphoric acid is diminished only to a degree corresponding to the atrophy of muscle fibers. Restoration of these low glycogen and phosphocreatine stores after muscle contractions is delayed and incomplete.¹¹ The disappearance of energy stores has been blamed on the fibrillations as a cause of excessive metabolism. The respiratory metabolism, however, of the denervated muscle—in situ or excised—shows no significant abnormalities.¹² Potassium, the intracellular electrolyte involved in muscle contraction, is increased during the first days after nerve section and diminished after the onset of fibrillations.¹³ Changes are reported in some of the substances involved in cell respiration, such as myoglobin and glutathion. Their significance is as yet obscure. So is the importance of inter- and intracellular water content, of the calcium content and of a number of other chemical findings.

The main early functional sequelae of motor nerve section known today are:

1. Fatigability and hyperexcitability of the synapse.
2. Fatigability, decreased excitability and conductivity of nerve fibers.
3. Slow contraction, fibrillations and a lack of energy store materials in the muscle.

Regeneration and Therapy

It has been reported above how nerve fibers of the central stump bud and branch out to grow into newly formed Schwann's tubes of the peripheral stump. Many fibrillae go astray, and some reach the proper channels, which lead them distally to the end plates. Again, many fibers fail to make proper contacts with the synapse. Those which do take up function rapidly unless the end plate is severely damaged already. Whether the old end plate serves only as an outline for the formation of a new effector or resumes function in early regeneration is not decided. Under especially favorable conditions, e.g., in a rabbit with the peroneus nerve crushed, new fibers reached the end plates eighteen days after the injury, and faradic stimulation then caused a muscle contraction. Five days later the fibers were myelinated and reflex motion could be obtained in reinnervated muscles.²

Detailed physiologic studies of the regeneration period are not available. Clinical observations on return of function and electric reactions, chronaxie and electromyographic studies in humans are of doubtful value for our present discussion.

The main purpose of therapy is to facilitate and direct the growth of new fibers. After division of a nerve, surgical union—as early as possible—is imperative. When paralysis appears, it becomes important to avoid over-stretching of the muscle, by gravity or otherwise. Whether it is possible to combat the contracture of a paralyzed muscle effectively appears doubtful. Attempts have been made to suppress fibrillation with quinine, an inhibitor of the synapse. Apparently this has no effect on the progress of atrophy. Favorable results have been reported with atropine and reverse effects on fibrillation and atrophy with prostigmine.¹⁴

Clinical experience points strongly toward a favorable influence of massage and electric stimulation in peripheral palsy, and experimental results on animals after nerve section seem to concur.¹⁵⁻¹⁶⁻¹⁷ The treated muscle loses less weight and its chronaxie or electric excitability is less impaired than

seen in an untreated control.¹⁶⁻¹⁷ The treatment consisted of mild galvanic stimulation of the muscle, or, in another report, of intensive faradic and galvanic stimulation. How electric stimulation can help in preserving the function of the denervated muscle is obscure. As long as an abnormal fatigability of synapse and motor nerve and lack of energy material in the muscle are characteristic of denervation, strong stimulation of long duration with resulting powerful contractions will need special precautions as a clinical method.

References

1. Rosenblueth, A., and Morison, R. S.: Curarization, Fatigue and Wedensky Inhibition, *Am. J. Physiol.* **119**:236 (June) 1937.
2. Young, J. Z.: Functional Repair of Nervous Tissue, *Physiol. Rev.* **22**:318 (Oct.) 1942.
3. Rosenblueth, A., and Dempsey, E. W.: A Study of Wallerian Degeneration, *Am. J. Physiol.* **128**:19 (Dec.) 1939.
4. Tower, S. S.: The Reaction of Muscle to Denervation, *Physiol. Rev.* **19**:1 (Jan.) 1939.
5. Lissak, K.; Dempsey, E. W., and Rosenblueth, A.: The Failure of Transmission of Motor Nerve Impulses in the Course of Wallerian Degeneration, *Am. J. Physiol.* **128**:19 (Dec.) 1939.
6. Rosenblueth, A.; Lissak, K., and Lanari, A.: Explanation of the Five Stages of Neuromuscular and Ganglionic Synaptic Transmission, *Am. J. Physio.* **128**:3 (Dec.) 1939.
7. Conteaux, R., and Nachmansohn, D.: Cholinesterase at End Plates of Voluntary Muscle After Nerve Degeneration, *Nature* **142**:481 (Sept. 10) 1938.
8. Nachmansohn, D.: Cholin Esterase in Voluntary Muscle, *J. Physiol.* **95**:29 (Feb.) 1939.
9. Rosenblueth, A., and Lucio, T. V.: A Study of Denervated Mammalian Skeletal Muscle, *Am. J. Physiol.* **120**:781 (Dec.) 1937.
10. Hines, H. M., and Knowlton, G. C.: Changes in the Skeletal Muscle of the Rat Following Denervation, *Am. J. Physiol.* **104**:379 (May) 1933; Electrolyte and Water Changes in Muscle During Atrophy, *Am. J. Physiol.* **120**:719 (Dec.) 1937.
11. Levine, R.; Hechter, O., and Soskin, S.: Biochemical Characteristics of Denervated Skeletal Muscle, *Am. J. Physiol.* **132**:336 (March) 1941.
12. Knowlton, G. C., and Hines, H. M.: Respiratory Metabolism of Atrophic Muscle, *Am. J. Physiol.* **109**:200 (Aug.) 1934.
13. Fenn, W. O.: Factors Affecting the Loss of Potassium From Stimulated Muscles, *Am. J. Physiol.* **124**:213 (Oct.) 1938.
14. Levine, R.; Goodfriend, J., and Soskin, S.: Influence of Prostigmine, Atropine and Other Substances in Fibrillation and Atrophy, *Am. J. Physiol.* **135**:747 (Feb.) 1942.
15. Chor, H., and Others: Atrophy and Regeneration of the Gastrocnemius and Soleus Muscles, *J. A. M. A.* **113**:1029 (Sept. 10) 1939.
16. Fischer, E.: Effect of Faradic and Galvanic Stimulation Upon Course of Atrophy in Denervated Skeletal Muscle, *Am. J. Physiol.* **127**:605 (Nov.) 1939.
17. Gutman, E., and Guttmann, L.: Effect of Electrotherapy on Denervated Muscles, *Lancet* **1**:169 (Feb. 7) 1942.



ADDRESS FOR THE 1942 CLASS OF PHYSICAL THERAPY

The School of Physical Therapy, University of Pennsylvania

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ELWYN, PA.

In collegiate commencements it is customary to begin the exercises with a prayer. Now I cannot pretend to be a preacher and would not attempt a prayer at this time. However, there is a prayer which I keep in what I call my collection of gems. It was the prayer of an old white-haired darky person down in Mississippi. His prayer might well be the prayer of us all in these days of universal conflict. It went something like this:

Oh, Lowd; Give me dis obening de eyes of de eagle and de wisdom of de owl. Connect my soul wid de gospel telephone in de central skies! 'Luminate my brow wid de blessed sunshine of heben. 'Lectrify my brain wid de lightin' of dy word. Prizen my mind wid de love of de people. Put 'petual motion in me through and through. Turpentine my 'magination. Grease my lips wid 'possum oil. Fill me plump full of de dynamite of dy glory. Anoint me all over wid de kerosene of dy salvation' Set me on fire wid de torch of magnanimous love and send me out in dis worl to do my nachul dooty!

You have completed your studies in a new, but also an old, branch of the healing art. Just how old physical therapy is, it is difficult, if not impossible, to state. Heliotherapy is probably as old as man. The great Greek philosopher Thales was probably the one who actually discovered electricity when he noted that when amber, which the Greeks called "electron," was rubbed, it possessed the mysterious power of attracting to itself various light articles. His interpretation was that he had discovered the hidden principle of life and that amber had a soul. It never occurred to him or the philosophers who for centuries followed him that there was any connection between the "life of amber" and the electricity of a common storm. In the mystical ages which preceded the practical discovery, or rediscovery, of electricity, it was considered to be an agent of providence and every phenomenon belonging at all to the unusual was a spirit for good or evil.

The advance of electricity and particularly of electrotherapeutics from these philosophical beginnings to present day scientific application and accuracy is now well known to you. But electricity is only one of the agents you will have occasion to use in the practice of physical therapy. This brings me to a brief discussion of your part in the field of medicine. Your studies to date have given you an introduction to the broad field of medicine and intensive training in one of its valuable adjuncts.

The prime objective of the practice of medicine is the cure of the patient. In many instances this is a cooperative undertaking just as the flight of a bomber is a cooperative undertaking. It is said that it requires forty men to put a bomber into the air. In the bomber itself is a specialized crew including the pilot, navigator, bombardier, etc. In the cure of the patient, just as in the flight of a bomber, a pilot is needed. With the patient, the physician must be the pilot. The kind of treatment is his responsibility. The decision to employ physical therapy must be made by him.

We must remember that many patients will get well without the aid of physicians, nurses, social workers, occupational therapy technicians or physical therapy technicians. We say that nature has been the healer. Nat-

ure makes many direct and indirect contributions to the recovery of every patient. Many of the secrets of nature have been revealed in our day, and future generations will discover others. Every new discovery and every new invention should be utilized for the good of the patient. There is a rather widespread tendency to magnify out of all reasonable proportion this or that form of cure without giving credit to nature. This tendency in some instances has led to nostrums and quackery. We must learn to evaluate the true worth of each and every form of therapy and to avoid certain tendencies towards commercial exploitation of methods.

In the ages to come, the first part of the twentieth century may be referred to by historians as the age of commercialism. It is true that there has been a widespread tendency, particularly in America, to commercialize nearly every commodity in our everyday life; and health has been no exception. The medical profession has frowned on this tendency for its members and for its adjuncts in this fundamental service for human needs. The profession should rise above this tendency, or rather never descend to it. While it is true that a certain amount of commercialization is essential to the business life of a community or nation, nevertheless, in the field of medicine the term is, I think, rightly looked on as a term of reproach. The art of the practice of medicine is to be used for the good of the patient and as such should rise above the concept of a commercial enterprise. This ideal of medicine should be stressed more emphatically than ever in the present day, when the universal tendency is toward measurement in commercial values.

It is a truism that every man should be paid for his services. Yet in the field of medicine it is difficult to put a price tag on the value of each form of aid rendered with the aim of returning the patient to health. Physicians have always been underpaid in the dollar and cents valuation, but they are frequently abundantly paid in the knowledge and keen satisfaction of having aided in the recovery of an individual. Physicians also donate an untold amount of service for suffering humanity. Those in the allied fields, such as yours, will probably always be underpaid, and you may also be called on to give time and effort without thought of compensation. Those who approach the field with this viewpoint will gain far greater reward in the personal joy of their work well done than those who attempt to commercialize their knowledge.

Any one who does his work well acquires a satisfaction from doing so in direct proportion to the degree that he has put himself into it. The payment for this type of satisfaction is often best found in the gratitude of the patient and the personal joy of success in one's chosen field. Medicine is basically a field of service. The late Dr. Richard Cabot has said:

We try to serve the world and in so doing we touch what is divine. We get our dignity, our courage, our joy in our work because of the greatness of the far off end, always in sight, always attainable, never at any moment attained. Service is one of the ways by which a tiny insect like one of us can get a purchase on the whole world. If we find the job where we can be of use, we are hitched to the star of the universe, and we move with it.

Physicians realize that healthy humans are or should be productive. The level of productivity drops with physical handicap and illness. The acutely sick may be fighting for life and must be encouraged to conserve strength. The convalescent, however, needs to see the road to recovery in order to return to productivity. In many cases the element of time is a vital factor to the patient and to the physician. Here the physical therapy technician can and does play an important part in hastening complete rehabilitation to physical and economic well being.

There are many ways of dealing with illness, and none of them enjoys a monopoly in the care and cure of the patient. The method which will produce the best results may be medical, the use of pharmaceutical preparations which act quickly and accurately; it may be surgical, an operation which gives prompt results, or it may be one of the adjuncts of medicine, physical therapy, occupational therapy or psychotherapy.

The physician is at the wheel and he must guide the undertaking and call on his aides as the picture of the case dictates. The practice of medicine, as I have said, is a cooperative undertaking. The best results can be obtained when the doctor, the nurse, the physical therapy technician and any other of the specialty workers attack the condition hand in hand for the attainment of a single objective, the cure of the patient.

In conclusion may I offer to you a little verse which I came across years ago and have kept in my collection of gems. The author of this is unknown.

Isn't it strange that princes and kings,
And clowns that caper in sawdust rings
And common folks like you and me
Are builders for eternity
To each is given a bag of tools,
A shapeless mass, and a book of rules;
And each must build, ere life has flown
A stumbling block, or a stepping stone.

TECHNICIAN EXAMINATIONS

During the month of June Registry examinations will be held in the following cities: Boston, Chicago, Minneapolis, New York, Richmond and St. Louis. Applications, credentials and fee should be sent as early as possible to the American Registry of Physical Therapy Technicians, 30 North Michigan Avenue, Chicago.

SIMPLE AIDS FOR ACTIVE MOTION OF FRACTURED HIPS *

THEODORE P. BROOKES, M.D., F.A.C.S.

and

STANLEY M. LEYDIG, M.D., F.A.C.S.

ST. LOUIS, MISSOURI

Various methods of internal fixation provide the absolute immobilization of fragments required by modern treatment of fractures about the hip. Sundry devices make possible the equally important early activation of the patient's limb and body. Such mobilization should be made as easy for the patient and as simple for the attendant as possible. Systematic active motion is of maximum importance to our efforts to reduce the high mortality among patients in the fractured hip age group.

Early complications such as hypostatic pneumonia, decubitus and pulmonary embolism are best averted by keeping the patient active from the very start. Later complications of nonunion and impaired function are prevented or corrected by the same means. Normal healing of fractures is dependent on alternating ischemia and hyperemia. This physiologic action is produced by active contraction and relaxation of muscles about the bone.¹

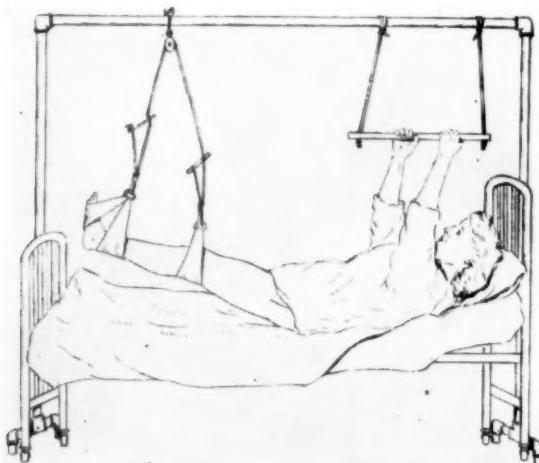


Fig. 1. — Overhead frame of $\frac{3}{4}$ -inch gas pipe with trapeze and exerciser in place. Exerciser slings are applied to the injured limb and drawn up to working position by the nurse without any effort by the patient.

Some hospital devices are too bunglesome for the patient to use or too complex for the attendant to set up readily. We have found the apparatus shown in figures 1 and 2 to be economically made, readily set up and gladly used. The overhead trapeze is a simple and efficient means to encourage active motion of the trunk and arms and to a less extent of the legs. A single gas pipe overhead is preferred to elaborate Balkan frames. The gas pipe can be quickly put together by the local plumber, the hospital engineer or the handy man. It is easily pushed aside when it interferes with examinations or nursing problems. The bed is not encumbered with extra weight and can be pulled out

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from under the frame whenever it is desired to take the patient and the bed to the x-ray or the sun room.

A section of broom stick 30 inches long makes an ideal trapeze. Metal handholds or towels or pieces of rope do not offer an adequate grip for an enfeebled and anxious patient. The broom stick is suspended from the pipe overhead by lengths of sash cord run through holes drilled in each end of the stick and fastened individually to the overhead. A single rope looped over the pipe to each end of the stick is unstable and defeats its purpose. Regardless of the type of fracture and the means used to secure immobilization of the fragments, the trapeze is put up as soon as the patient is put to bed. If anesthesia makes its immediate use unwise the entire frame can be pushed aside until the effects of anesthesia have worn off. No actual count has been recorded, but the hands and arms go up to the trapeze dozens of times each day and night to

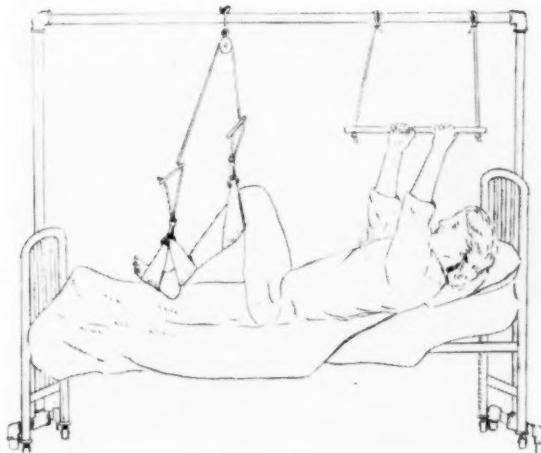


Fig. 2. — Free-rolling trolley and pulley permit wide range of active motion from minimal abduction and adduction to maximal lateral swing and flexion.

assist in shifts of head, shoulders and trunk. Use of the trapeze simplifies nursing problems for both patient and nurse. In fact we sometimes wonder why all bedridden patients are not supplied with some such device unless it is definitely contraindicated by particular complications.

Internal fixation of fractures about the hip without opening of the joint capsule is the preferred technic. Such preservation of the integrity of the capsule permits early active motion after placement of flanged nails,² multiple pins,³ lag bolts,⁴ or Neufeld nails.⁵ However, the repaired bone and damaged soft tissues should not be called on to raise and support the weight of the limb. The human lower limb comprises 15 to 20 per cent of the body's total weight. Rather than slide the foot over a powdered board or place the heel in a roller skate, we prefer the Guthrie-Smith exerciser⁶ for efficiency, simplicity and comfort. Slings carry the weight of the limb. A trolley roller allows the suspension cord to move from place to place as knee and thigh are flexed, and at the same time it supports the limb.

The exerciser is employed as soon as local conditions permit and the limb is free of splinting hindrance. The lapse of time required varies with different types of fractures about the hip. After internal fixation of the neck of the femur with a flanged nail, the limb is suspended fifteen to thirty minutes at a time, beginning the second to fourth day after operation. Internal fixation of a

pertrochanteric fracture, with the associated greater damage to soft tissues, leads us to wait a week before instituting use of the exerciser. In the interim the trapeze encourages maintenance of muscle function in arms and trunk. The well thigh⁷ countertraction splint for comminuted pertrochanteric fractures and subtrachanteric fractures will be removed after six to eight weeks, and cautious use of the exerciser can follow promptly. After removal of a double plaster of paris spica for immobilization according to the Whitman technic,⁹ both legs will need the exerciser. Permission is frequently asked to exercise



Fig. 3. — Details of Guthrie-Smith type of exerciser. Slings are of heavy ducking or canvas: (a) foot sling, 14½ by 3½ inches; (b) ankle sling, 17½ by 4 inches; (c) knee sling, 19½ by 4 inches. The trolley, roller, pulley and snaps are self evident.

the well limb in addition to the injured one. The mobile frame makes it easy to shift the position of the exerciser.

The patient is encouraged to move the limbs at will while they are suspended and to stop short of fatigue. All patients in whom internal fixation has been done and all those treated by well thigh countertraction are put in wheel chairs for as long as is comfortable each day after recovery from anesthesia. Obviously the mortality rate will be high among patients suffering injury of the severity of fracture about the hip, particularly in the usual advanced age group. Even so, the trapeze and exerciser afford comfort and ease of handling during the time spent in bed and offer encouragement and hope to one who is bound to be disheartened by the prospect of prolonged inactivity. Nursing care is simplified.

(Continued on page 307)

INFRA-RED URTICARIA

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Unusual sensitivity to physical agents in occasional persons is a well recognized but not common occurrence as judged by the literature. Duke¹ has reported typical examples of urticarial reactions from a variety of stimuli. These included dermographica (urticaria from mechanical irritation), urticaria haemalis (caused by cold), urticaria ab igne (localized urticaria in a previously burned area), urticaria calorica (caused by heat in any form, including physical exertion) and urticaria solaris (caused by sunlight). In the case of urticaria solaris the ultraviolet portion of the sun's spectrum was thought to be responsible for the reaction, although spectral analysis was not complete. Arnold,² Stokes and associates³ and Blum⁴ made extensive reviews of the literature on urticaria solaris with particular attention to reports in which attempts were made to identify the exact wavelength required to energize this reaction. Arnold concluded that of the 12 cases reported in which spectral analyses were adequate, in 5 the reactions were to violet light and not to ultraviolet rays in wavelengths shorter than 3,200 angstroms, in 3 the reactions were to wavelengths shorter than 3,200 angstroms but not to violet or other visible light and in 4 there were reactions to either or both. He also reported a case of his own with careful studies to delimit the responsible wavelengths and concluded that the patient's sensitivity was to wavelengths between 3,800 and 5,000 angstroms. Blum has also stated that urticaria solaris is caused by near ultraviolet and the blue and violet portion of the visible spectrum.⁴

Urticarial response to wavelengths in the infra-red zone (greater than 7,900 angstroms) alone has not been found in any of these reported cases, although in some instances sufficient studies were not done to determine this point. In view of the widespread use of infra-red radiation for local heating effect, urticarial reactions to these wavelengths must therefore be extremely rare. A case is accordingly reported in which an urticarial reaction was produced only by irradiation with the infra-red portion of the spectrum as determined by the spectral analyses to be described.

Report of a Case

An Italian laborer, aged 37, was referred to the Physical Therapy Department of the Massachusetts General Hospital for treatment of his left shoulder. Eighteen months previously, while lifting a 100 pound bag he had suffered pain in the left shoulder and neck which had continued intermittently from that date until the present and had been increased by any strenuous use of the left arm. There also occurred a definite weakness of the shoulder girdle muscles, with atrophy. Extensive studies in the hospital revealed hypesthesia of the third, fourth and fifth cervical dermatomes and weakness and atrophy of the supraspinatus and infraspinatus and deltoid muscles on the left. Roentgenograms of the spine and shoulder were normal and studies with iodized oil revealed no evidence of obstruction in the spinal subarachnoid space. The diagnosis was brachial plexus injury, and he was started on a series of treatments consisting of luminous heat, massage and muscle reeducation for the affected extremity.

After his first exposure to luminous heat a blotchy erythema appeared, and in addition numerous small urticarial wheals accompanied with moderate itching (fig. 1). This reaction was located over the entire area exposed, including the whole upper back, shoulder girdle and upper arm. On further questioning the patient gave a history of similar urti-

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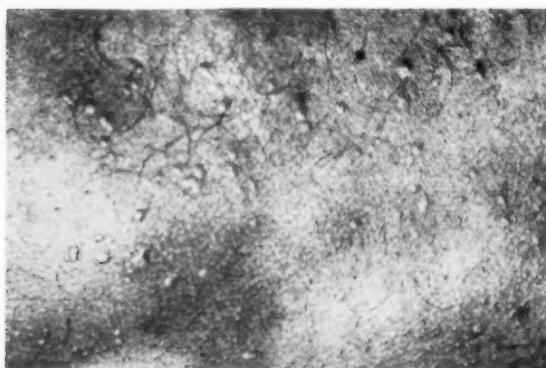


Fig. 1.—Urticarial skin reaction on the back of a patient after a ten minute exposure to a luminous heat lamp.

carial reactions when exposed to sunlight. These had appeared on the face, trunk and extremities in the past. He had noted, however, that the face and more frequently exposed surfaces of the extremities were less sensitive than the trunk. At the end of the summer some tolerance apparently developed, for the extremities showed reactions only after excessive exposures and the face almost never. This sensitivity had been present for fifteen or twenty years and had no apparent relationship to the brachial plexus injury. There was no history of food sensitivity, hay fever or other allergic manifestation. This

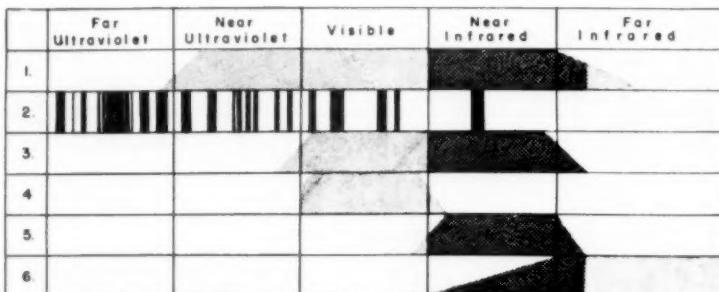


Fig. 2.—Six photosensitivity tests and the portions of the spectrum to which the skin was exposed. Cross hatching indicates that an urticarial reaction was observed.
1. Unfiltered solar radiation. 2. Radiation from unfiltered high pressure mercury vapor arc generator (Hanovia "alpine"). 3. Superheated tungsten filament lamp ("ultrad"). 4. The same with a Corning filter, 396. 5. Radiation from a 500-watt Mazda lamp (Hanovia "sollux") through a Corning filter, 255. 6. Radiation from a non-luminous coil type of infra-red generator.

reaction was observed repeatedly during the course of treatment and special studies were done to determine the action spectrum.

Photosensitivity Tests

In order to determine the wavelengths which energized this urticarial reaction a series of tests were done, with utilization of a combination of different light sources and filters similar to the method described by McLoughlin and Krusen⁵ (fig. 2). The portions of the spectrum investigated were near and far ultraviolet, visible light and near and far infra-red. Both the anterior and posterior aspects of the trunk were tested so that skin with normal sensation as well as that with the sensory defect were irradiated simultaneously. As a carbon arc lamp was not available, the source of ultraviolet light was a commercial high pressure quartz mercury vapor arc generator. This, of course, does not emit a continuous spectrum but contains a number of intense lines in the far ultraviolet and is relatively deficient in the near ultraviolet, visible and infra-red portions with the length of exposure possible. At a distance of 30 inches a thirty-second exposure was

given, which was known to be twice the minimal erythema dose for that particular lamp. A normal type of sunburn response appeared in about six hours and faded in twenty-four hours without any urticarial reaction.

A superheated tungsten filament lamp with filter containing ethylene glycol to prevent transmission of the far infra-red ("ultrad") was utilized in the next test. The spectral limits of emission were from 3,100 angstroms in the near ultraviolet to 14,000 angstroms in the infra-red. A ten minute exposure at 18 inches produced the urticarial response as described, and its appearance was the same in the area of hypesthesia as that elsewhere.

The patient was exposed to visible light alone in the next test. The same superheated tungsten filament lamp was used, but in this instance a Corning filter No. 396 was attached in a cloth hood in the manner described by Lewis and Hopper.⁶ This filter absorbs ultraviolet and infra-red to a great extent, so that more than 75 per cent of the transmitted rays were visible. In this test a thirty minute exposure at 18 inches produced no reaction.

A 500 watt Mazda bulb with a Corning filter No. 255 allowing transmission in the near infra-red spectrum alone was used to test the patient's sensitivity to near infra-red wavelengths. With this combination at a distance of 18 inches a similar urticarial reaction appeared in about ten minutes.

As filters are not adaptable for separating portions of the infra-red spectrum, the only test for far infra-red reaction was made with a commercial infra-red generator. This source of heat, of course, emits in the far infrared (longer than 14,000 angstroms) and to a lesser extent in the near infrared as well. At a distance of 18 inches the urticarial reaction appeared in about twenty-five minutes.

It was inferred from an analysis of these examinations that the only portion of the spectrum causing the urticarial reaction was the near infrared and possibly also the far infra-red. As energy of these wavelengths is usually thought of as heat, the patient's reaction to other methods of increasing temperature was of interest. Exercising in a warm room until marked sweating occurred produced no skin reaction, nor did a hot tub bath. Application of short wave diathermy with induction cable technic for thirty minutes also failed to cause urticaria. Ice packs applied for five minutes produced no abnormal reaction, which further indicated that the reaction was not caused by changes in temperature. The conclusion was therefore reached that infra-red radiation was the only known stimulus for this unusual skin reaction.

Comment

The photosensitivity tests which have been done are admittedly not complete, for it is possible that with greater intensity of irradiation some of the wavelengths apparently inactive might conceivably energize this reaction. Only those doses were used which lie within the range of common therapeutic practice. There have been reported lethal effects in sensitive guinea pigs from exposure to infra-red rays as well as other portions of solar radiation, but in these cases there was no urticaria.⁷ Mathieu⁸ reported the occurrence of urticaria in a case of brachial plexus injury, but this was not in response to radiation as far as was determined. In our case the history of urticaria preceded the brachial plexus injury and the reaction was not confined to the affected area; thus there would seem to be no causal relationship. Blum⁹ found in his studies, as in our case, that the trunk was much more sensitive than the face and hands. He felt that the sensitizing substance might be a carotenoid, since the absorption spectrum of the caro-

tenoids lies almost entirely within the blue and violet bands, which were the activating ones in his cases. No similar conclusions are attempted in this case, as the effective bands in the infra-red were not sharply demarcated and I am not aware of the existence of a photosensitizing substance whose absorption bands correspond to the action spectrum of this reaction. The explanation for this phenomenon is therefore obscure, and the only classification suggested is that of an unusual type of photosensitivity.

Summary

A case has been reported of urticarial reaction from exposure to sunlight and luminous and infra-red heating lamps. Photosensitivity studies indicated that the action spectrum was confined to the infra-red, principally in wavelengths from 7,900 to 14,000 angstroms.

References

1. Duke, W. W.: Urticaria Caused Specifically by the Action of Physical Agents, J. A. M. A. **83**:3 (July) 1924.
2. Arnold, H. L., Jr.: Urticaria Solaris, Arch. Dermat. & Syph. **43**:607 (April) 1941.
3. Stokes, J. H.; Beerman, H., and Ingraham, N. R., Jr.: Photodynamic Effects in Dermatology, Am. J. M. Sc. **204**:601 (Dec.) 1942.
4. Blum, H. F.: Photodynamic Action and Diseases Caused by Light, New York, Reinhold Publishing Corp., 1941, p. 190.
5. McLoughlin, C. J., and Krusen, F. H.: A Practical Skin Test for the Study of Photosensitivity, Proc. Staff Meet., Mayo Clin. **16**:478 (July) 1941.
6. Lewis, G. M., and Hopper, M. E.: Filtered Ultraviolet Rays: An Inexpensive Unit for Their Isolation, Arch. Dermat. & Syph. **34**:681 (Oct.) 1936.
7. Pinner, M., and Margulis, A. E.: The Lethal Effects of Solar Radiation on Guinea Pigs, Ann. Int. Med. **10**:214 (Aug.) 1936.
8. Mathieu, E.: Un cas d'urticaire profonde compliquée de paralysie du plexus brachial, Union med. du Canada **61**:377 (Feb.) 1932.
9. Blum, H. F., and West, R. J.: Urticarial Response to Blue and Violet Light, J. Clin. Investigation **16**:261 (Mar.) 1937.



PHYSICAL AND OCCUPATIONAL THERAPY IN REHABILITATION

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CHICAGO

Rehabilitation is the planned attempt through the use of all recognized measures, under skilled direction, to restore those persons who because of disabilities do not assume to the greatest possible extent and at the earliest possible time that place in the productive stream of society which they are potentially capable of assuming. This is the definition of rehabilitation that was approved by the Council of Rehabilitation which met in New York in 1942. This Council meeting was attended by representatives from practically all the societies concerned in rehabilitation.

The story of the rehabilitation of the injured workman or the injured person in our armed forces is told by one case related by Watson-Jones, the author of a recent book on fractures. He said:

An air gunner was admitted to a civilian orthopaedic hospital in November, 1940, for the treatment of a torn and displaced semilunar cartilage. In August, 1941, no less than ten months after admission, he was still in the hospital and still totally incapacitated. Why was recovery so long delayed? What possible explanation could there be? The diagnosis had been correctly made and a skilful operation performed. The wound had healed by first intention; there was no infection, arthritis, or surgical complication. Daily massage had been continued, but the muscles were still wasted and weak. Two manipulations had been performed under anaesthesia, but movement was only half of normal. The gait was slow and hesitant, he limped; he could not run . . . he had never tried to run. The medical officer blamed him because "he would not cooperate," because he was disinterested, depressed and resentful. He was certainly depressed, for after ten months the incapacity was more complete than on the day of admission. He was disinterested because, in his words, "nobody takes any notice, and it looks as if it is hopeless." He was resentful because he could not believe that the fault was his. Had he not been told that "the nerve in his knee was cut?"

He was transferred to one of the orthopaedic rehabilitation centers of the R. A. F. Medical Service. He saw the sky, the sea, the open spaces. For many months he had seen only the stone walls of hospital wards, the stone walls of massage rooms, the stone walls of many corridors. In his new surroundings there was a lounge and writing-room, there were tasteful decorations and flowers, a varied menu, and an atmosphere of well-being and contentment. After a few days he smiled. There was sometimes a sparkle in his eye. He sensed a spirit of optimism and was reassured. His difficulties were explained and he was taught special exercises. He learned to walk and then to run. He became an enthusiast and worked in the gymnasium, played on the fields, swam in the pool, cycled on the track. In the evenings he attended lectures and concerts or played billiards and table tennis. Time raced past for he was busy. He became bronzed and fit. He laughed and was full of the joy of life. In seven weeks he returned to his unit and to full duty. The "nerve in his knee" was forgotten.

Ten months' total incapacity—seven weeks for full recovery; that is the story of rehabilitation in one air gunner. But is this an isolated case from which no conclusion should be drawn? The answer lies in the records of industry, the files of insurance companies. These records show that the experience of the air gunner is typical of many patients. In this country, at this moment, there are hundreds of injured men whose surgical treatment was concluded months ago but whose incapacity is still total because minor disuse changes remain or because confidence is lacking and morale has been destroyed. Their bodies have been treated but not their minds. Treatment has been concentrated

* Presented at the Symposium on Rehabilitation, Fifth Annual Congress on Industrial Health, Joint Presentation by the Council on Physical Therapy and the Council on Industrial Health, American Medical Association, January 12, 1943.

on the repair of bone and not on the tone and volume of muscles, stability of joints, circulation of limbs, control of edema, and relief of adhesions. There had been no measurement and graduation of physical activity, no continuation of treatment until the patient recognized for himself that recovery was complete. It has been assumed that union of a fracture was followed promptly by the return of full function and that when a man left the hospital he soon returned to work. But now that members of the service may not be discharged as outpatients and lost sight of, it is found that a simple cartilage operation may cause more than ten months' incapacity. We have known that a Colles' fracture is united in six weeks but not that this injury may keep a man from work for six months. We knew that fractures of the ankle were healed in twelve weeks but not that they often incapacitated workmen for twelve months. We never conceived that in one series of 276 men there could be a wastage of no less than 168 working years and that stiffness, swelling, weakness and wasting may appear insuperable difficulties to many patients who, being inexperienced, fear that the weakness may be permanent, are terrified of normal strains and hazards, are overwhelmed by the prospect of work and express their fears in the symptoms of "neurasthenia" and "malingering."

In the last war the Surgeon General of the Army had a department of rehabilitation in charge of Dr. Frank Billings, of Chicago, as colonel in the Medical Corps. In this department there were physicians such as Dr. Harry Mock, of Chicago, and Dr. Frank Granger, of Boston, who had had practical experience in rehabilitation. Dr. Harry Mock is now the only living representative of the trio.

In the present war the Surgeon General of the Army in his office has left the physical therapy of the injured soldier in charge of a woman physical therapy aide. This work is ostensibly in charge of a board of Regular Army medical officers who are the highest type of regular medical officer, but as far as can be determined they have had no recent experience in physical and occupational therapy and no experience in the rehabilitation of the injured man. A recent bill passed by the House of Representatives and the Senate and signed by the President gave to physical therapy aides in the army the same relative rank as nurses but omitted occupational therapy aides. It provides for a director of physical therapy aides in the Army. This director is the woman physical therapy aide mentioned. Apparently, however, there is nothing in the setup to place a qualified medical officer in charge of rehabilitation.

Rehabilitation should start at the bedside of the injured patient and should include physical and occupational therapy and later vocational rehabilitation. For instance, in a large civilian hospital in Chicago the injured patient who has received surgical treatment is given physical and occupational therapy at the bedside and as soon as possible he is sent to the department of physical therapy and to the curative workshop of the occupational therapy department. Rehabilitation of the patient starts at the bedside.

The surgical care and the facilities provided for this care of the injured soldier or workman are too often taken as a yardstick for the measurement of the total care of the injured patient. The yardstick for the measurement of surgical care should be the rehabilitation of the injured person, i. e., his restoration to the greatest possible extent and at the earliest possible time to that place in the productive stream of society which he is potentially capable of assuming.

Rehabilitation of the injured person must begin while he is still in bed. Dr. Robert H. Kennedy, of New York, chairman of the Fracture Committee of the American College of Surgeons, has the following to say on fracture treatment:

A fracture patient enters the hospital a broken man, not a sick man physically or mentally. The less he is put in the category of the sick patient and the more he is treated as a person who was well an instant before the accident and expects to remain well, the shorter will be the periods in which he needs convalescent care. . . . The fracture patient needs work therapy—not a vacation but a hardening process. Ways and means should be devised to keep his mind and body occupied from the start. He should not be treated as a star boarder but as a perfectly well man except for one cracked-up part.

Occupational therapy needs to be introduced much more widely in general hospitals. The great difficulty is to keep it from developing into a routine rather than using imagination to make the best adaptation for the individual patient. Physicians in general cannot know how to do this but they should recognize its value, know when it is well done and back it enthusiastically. Occupational therapy is many times more valuable than the usual types of physical therapy for these patients.

The social service department has a large opportunity in convalescent care while the patient is still in an acute surgical bed. Probably the patient had no neurosis at the time of injury, at least not one sufficient to keep him from working. The social service status needs to be gone into and put in writing in the first few days after injury. Many persons seem to do excellently while hospitalized, but their whole mental attitude apparently changes shortly after discharge.

Kennedy believes that a well man coming to a general hospital with a fracture should not be treated as if he were ill but as a convalescent from the start. He should be taught from the first day how to use all joints and muscles in the region of immobilization. He should be started immediately on general exercise to preserve the musculature. He should be given a job to do while in bed which will occupy his body and mind and make him feel he is still a part of a moving world. As soon as he is out of bed he should be taught some form of occupational therapy, if possible similar to the work he did before he was hurt. As soon as he is fit for discharge from the hospital he should be an ambulatory patient if his home conditions warrant. If not, he should go to an institution where the injured are by themselves and where every one gets work therapy.

The "Manual of Physical Therapy" was published in *War Medicine* and since has been published by the American Medical Association as a small pamphlet, price 25 cents. It was edited by the Council on Physical Therapy of the American Medical Association and the National Research Council.

The "Manual of Occupational Therapy," which is soon to be published in *War Medicine*, will likewise be published as a small pamphlet by the American Medical Association. This manual was written by a committee of the American Occupational Therapy Association and edited by the National Research Council and the Council on Physical Therapy of the American Medical Association. Physical and occupational therapy, we believe, are the first two steps in a rehabilitation program of the injured or sick person. There is discussed in these manuals the use of physical and occupational therapy in strains, sprains, muscle injuries, dislocations, fractures, peripheral nerve injuries, head injuries, arthritis, infantile paralysis, heart conditions, tuberculosis, spastic paralysis and nervous and mental conditions.

The Council on Physical Therapy aided by a committee of consultants, who were prominent surgeons, and the American Association of Limb Manufacturers recently published "A Manual of Amputations." Here again the value of physical and occupational therapy in amputation is shown.

The Council on Physical Therapy of the American Medical Association likewise published a "Handbook of Physical Therapy." This book is now being revised for its fourth edition. It emphasizes the place of physical therapy in the rehabilitation of the sick and the injured. It is used as a textbook in many schools for physical therapy technicians and in many medical schools where medical students are taught physical therapy.

In the equipment of departments for physical and occupational therapy

rehabilitation the Council on Physical Therapy of the American Medical Association has a supply of numerous mimeographed designs of apparatus for electrotherapy and exercises. The author will furnish these designs and a description of the equipment used in such departments in a large general hospital in Chicago. The Council on Physical Therapy also publishes yearly a free pamphlet "Apparatus Accepted," which lists the apparatus which is safe and effective. Apparatus is not the important element in physical and occupational therapy in rehabilitation, but personnel is.

No program of rehabilitation either in our armed forces or in civilian life will be effective unless it is in charge of a physician. This physician must be interested solely in the rehabilitation of patients and not in furnishing to the insurance companies or courts reports on the patient's condition. In a report of seven years' experience in a rehabilitation clinic with coal miners in Scotland it was clearly shown that the physician in charge could not render reports to the companies or appear in the courts. The injured patient who was sent to the rehabilitation clinic soon lost confidence in a physician who was doing this, as he thought the physician was always against him. The physician in charge of rehabilitation must consider his patients, as Robinson recently stated in his book "The Patient as a Person." Robinson shows that the human problems which surround the patient form an important component of injury and illness and that it is the physician's duty to understand them. The physician in charge of rehabilitation is in a most favorable position to study the human organism in its entirety, both as a living mechanism and as the essential element of human society. In the hospital ward or room the physician attending the patient has little time available for the serious consideration of the person and the personal problems that are contributory to his illness. The patient treated in the physical and occupational therapy department spends possibly an hour in the physical therapy department and three hours in the occupational therapy department. Thus the physician in charge and his technicians have time to discover and to help control the social influences detrimental to the sick and to the injured.

The Army is partially recognizing this, as it is placing physical therapy physicians in charge of its physical therapy department. Once again the influence of the woman physical therapy aide in the Surgeon General's Office is felt, and there is no provision for this physician to be in charge of rehabilitation and few occupational curative workshops have been established.

The physical and occupational therapy technicians (or aides, as the Army designates them) should meet the requirements set up by the American Registry of Physical Therapy Technicians at 30 North Michigan Avenue, Chicago, and the National Registry of Occupational Therapy is at 175 Fifth Avenue, New York city. No rehabilitation program can be successful without the hands and brains of a good technician or aide. Personnel is the most important element in the use of physical and occupational therapy in rehabilitation.

This paper considers only the use of physical and occupational therapy in the rehabilitation program of the injured because the other papers on this program consider the psychiatric problems of rehabilitation and vocational rehabilitation.

In conclusion it is again emphasized that the injured patient in the armed forces must receive the same physical and occupational therapy as the injured civilian patient receives in the best civilian hospitals. This can only be accomplished if there is a department of rehabilitation in the Office of the Surgeon General which will control the physicians and the technicians, starting rehabilitation in the hospitals of the armed forces by using physical and occupational therapy at the bedside of the patient.

ARCHIVES of PHYSICAL THERAPY

OFFICIAL PUBLICATION AMERICAN CONGRESS OF PHYSICAL THERAPY

. . . EDITORIALS . . .

PHYSICAL THERAPY AND THE PROBLEM OF REHABILITATION

In wartime the problem of rehabilitation of the disabled looms large. Recently physicians have shown great interest in the rehabilitation problem. Because of the fact that physical therapy is of the very greatest importance in rehabilitation of the disabled, it behooves us to give special attention to this subject. Elsewhere in this issue appear excellent papers by Coulter¹ and by Solomon² dealing with this problem.

Solomon pointed out that "the problem of rehabilitation is a psychiatric one," and Coulter stated that "rehabilitation is the planned attempt through the use of all recognized measures, under skilled direction, to restore those persons who because of disability do not assume to the greatest possible extent and at the earliest possible time that place in the productive stream of society which they are potentially capable of assuming." In most instances, the actual treatment of patients needing rehabilitation will be done by skilled physical therapy technicians and occupational therapy technicians under the direction of physicians who are trained in physical therapy. These physicians must, as Solomon has indicated, be familiar with the psychiatric aspect of the problem and in some instances may need the assistance of trained psychiatrists in rehabilitating certain of their patients.

Coulter has mentioned Watson-Jones' patient who when transferred to an orthopedic rehabilitation center made recovery in seven weeks, whereas previously during ten months in an ordinary hospital he had remained totally incapacitated.

Major Huddleston, one of the officers of this Congress who is Chief of Physical Therapy of the Fitzsimons General Hospital at Denver, Colorado, has made an important step in the right direction by organizing a convalescent ward in which the patients are not pampered, nor permitted the lax discipline of the usual hospital ward, but are rehabilitated under a strict military regimen under the direction of army sergeants and without the regular nursing care which is provided for sicker patients. Interestingly enough, the patients much prefer the strict discipline, to which they are subjected, to the usual hospital routine. While they convalesce, they are given special exercises and continue treatments in the department of physical therapy of the hospital. The ward is under the supervision of the medical officers in physical therapy who direct all the activities of these convalescent patients.

This program has attracted much favorable attention and an army officer who visited Fitzsimons Hospital recently expressed the opinion that Huddleston's convalescent ward plan would spread rapidly into all of the army hospitals of the country.

Coulter has quoted Kennedy as saying that "The fracture patient needs work therapy—not a vacation but a hardening process." This is exactly what is being done at the Fitzsimons Hospital. The patients are given

work therapy and a hardening process and not a vacation and they revel in this type of management.

It seems apparent that eventually in military hospitals the rehabilitation program will start out with the wounded patient in the medical or surgical ward; then in many instances, the patient will be referred to the department of physical therapy, then to the department of occupational therapy and at about this time, will be transferred to a convalescent ward. Also about this time, he will be placed in a program for limited class exercises and then will progress into a sheltered workshop or be given other limited activity or work therapy and finally will be returned to duty, or after being rehabilitated in so far as possible, he will be trained in some useful occupation compatible with his limited capabilities and returned to civilian life.

In the London *Lancet* for January 23, 1943³ there appeared a discussion of the Tomlinson report on rehabilitation of persons wounded in the war. It was stated that "Rehabilitation is a new field of remedial activity with great possibilities. . . . The major 'assumptions' are money to provide the equipment, time to train the personnel, and full recognition of remedial therapy as a branch of medicine; none of them out of reach if public opinion considers the object worth while. . . . Two proposals of a highly practical kind stand out from the rest. One is that the universities and royal colleges should consider instituting a diploma to cover the special needs of rehabilitation; there is at present little to attract a sufficient supply of qualified persons to what the report calls '*medical rehabilitation*'. . . . The other is to avoid the term 'disabled person' and to substitute 'persons handicapped by disablement.' The factor of disablement must be considered not in its personal sense but in its relation to employability. . . . A survey of occupations suitable to particular disablements is to be made by the Ministry of Labor. All in all, the Tomlinson report looks rather like a charter for the handicapped."

Physical and occupational therapy loom large in the British rehabilitation program and in America there are already a large number of trained physical and occupational therapy technicians capable of working under medical supervision in the rehabilitation of the disabled. It is apparent that American physicians, like the British physicians, are giving serious consideration to the problem of rehabilitation. It is obvious that our military executives must devote more attention to the organization of proper facilities for rehabilitation of disabled soldiers and sailors through the medium of trained physical therapy physicians who should direct the activities of qualified physical and occupational therapy technicians.

The American Congress of Physical Therapy can perform an outstanding service to humanity by furthering the campaign to organize an adequate program of rehabilitation in the departments of physical therapy and occupational therapy of civilian and military hospitals.

References

1. Coulter, John S.: Physical and Occupational Therapy in Rehabilitation, Arch. Phys. Therapy 24:295 (May) 1943.
2. Solomon, A. P.: Psychiatric Problems in Rehabilitation, Arch. Phys. Therapy 24:270 (May) 1943.
3. Editorial: The Tomlinson Report, Lancet 1:113 (Jan. 23) 1943.

THE MEETING OF THE MIDWESTERN SECTION

The annual meeting of the Midwestern Section of the American Congress of Physical Therapy will be held at the Mayo Clinic, Rochester, Minnesota, on May 28, 1943. An interesting program has been arranged which should be well worth attending. Throughout the day the meetings will be held in the Mayo Foundation House, the beautiful old home of Dr. W. J. Mayo, which, at his request, was converted into a meeting place for members of the Clinic staff and other physicians. It is believed that this will be found to be a delightful place in which to meet.

The morning session, which will begin at 9 a. m., will start with a paper on "Effect of Cold," by Dr. Max Newman, of Detroit, Michigan, who has done much research on the subject of cryotherapy. Dr. F. A. Hellebrandt, of the University of Wisconsin, who has done a great deal of investigation concerning posture and bodily mechanics, will have an interesting paper on the subject of "The Eccentricity of Standing and Its Cause." Dr. Milton G. Schmitt of Northwestern University, Chicago, will discuss the subject of treatment of low back pain by physical measures. The morning session will close with a discussion of "Physical Therapy and the War," by Dr. Frank H. Krusen, of the Mayo Clinic.

At noontime a luncheon will be tendered by the Mayo Foundation to all the members and guests of the American Congress of Physical Therapy who are in attendance at this meeting.

The afternoon session also will be held at the Mayo Foundation House and will start at 2 p. m. An interesting program has been arranged. Dr. Edgar A. Hines, of the vascular service of the Mayo Clinic, will discuss the "Effect of Heat and Cold on the Circulation," and this paper will be followed by a symposium on poliomyelitis, including papers by Dr. Miland E. Knapp, of the University of Minnesota, on "Recent Developments in the Kenny Treatment of Poliomyelitis"; by Dr. H. M. Hines, physiologist of the University of Iowa, on "Studies on the Recovering of Muscle From Partial Paralysis"; and by the clinicians from the University of Iowa, Drs. A. L. Sahs and W. D. Paul, on "Neuronitis, Its Differentiation From Poliomyelitis." Because of Dr. Knapp's intimate association with the Kenny treatment, Dr. Hines' excellent studies on the physiology of muscle in poliomyelitis and the clinicians' (Drs. Sahs and Paul's) interest in the differential diagnosis of poliomyelitis, this symposium should be of great interest.

Following the afternoon session, a dinner will be served at the café of the Hotel Kahler, after which the physicians in attendance will adjourn to the Assembly Room of the Mayo Clinic for an evening session. This will start at 8:30 p. m.

At the evening session, there will be a paper by Dr. John S. Coulter, of Northwestern University, dealing with the relation of physical therapy to rehabilitation, and a paper by Dr. Ralph Ghormley, orthopedic surgeon at the Mayo Clinic, on the "Orthopedic Aspects of the Backache Problem."

For those who care to stay over until Saturday morning, a tour of the departments of physical medicine at St. Mary's Hospital and at the Mayo Clinic has been arranged and this will be conducted from 9 to 12 a. m. by Dr. Earl C. Elkins, of the Section of Physical Medicine of the Mayo Clinic. Many of the visiting physical therapy physicians may be desirous of seeing the recently remodeled department of physical medicine at St. Mary's Hospital as well as the department at the Mayo Clinic.

Physicians who plan to attend this interesting meeting should make reservations early because hotel accommodations in Rochester are now very much

limited. Although many national meetings of medical organizations are not being held in wartime, such local sectional meetings are sanctioned and physicians who are dealing with problems of rehabilitation should find much valuable material in this excellent program.

ANNUAL CONVENTION

The American Congress of Physical Therapy will hold its 22nd Annual Scientific and Clinical Session at the Palmer House in Chicago on Wednesday, September 8; Thursday, September 9 and Friday, September 10. Clinics will be held at the various hospitals on Saturday morning, September 11th.

The keynote of the convention will be Rehabilitation. We are all aware of its importance and its significance is daily growing greater with the expansion of the armed forces and the "all out" expansion of industry on the home front. It is of utmost importance for us, who are responsible for guarding the home front to be active and alert to disseminate information which will be of value to keep the workman on the job or greatly speed up his recovery period and shorten time lost at this vital time.

To mention the value of physical therapy in rehabilitation would only be repeating an accepted fact for emphasis.

The program this year will place special emphasis on the value of physical therapy in the clinical phase of rehabilitation especially as it is being used in the army and in industry. Watch future issues of the ARCHIVES for the announcement of the preliminary program.

The seminar lectures will be continued as in previous years. Two one-hour course lectures will be given daily as well as a demonstration each day of an hour and a half. In the seminar the practical phases of physical therapy will be stressed. Because of the popularity of the round table last year, it will again be given this year and is open to everyone attending the course.

The instruction course will be given three days, September 8, 9 and 10. Nine lectures, one of which will be the Round Table, are offered. Each section will be limited; therefore, it is important to make your reservations early by writing to the American Congress of Physical Therapy, 30 N. Michigan Avenue, Chicago, Illinois.

All members of the Congress and all others interested in physical therapy should make plans now to attend this all important session. Hotel accommodations are available, but reservations should be made as early as possible.



MEDICAL NEWS

Brigadier General Norman T. Kirk Nominated for Surgeon General

The nomination of Norman T. Kirk to be Surgeon General of the Army with the rank of major general has been sent to the senate by the President. General Kirk, who is 55 years old, was until recently commanding general of the Percy L. Jones General Hospital in Battle Creek, Mich. He was formerly chief of the surgical service at the Army Medical Center at the Walter Reed General Hospital, Washington, D. C. He entered the army medical corps in 1913 with the rank of first lieutenant. He is to succeed Major Gen. James C. Magee, whose term expires on June 1.

Dr. Kovacs and Dr. Currence Speak on Arthritis

Among the speakers at the fifty-first annual meeting of the Connecticut State Medical Society will be Dr. John D. Currence of New York, who will address the Society on the subject of "Arthritic and Rheumatic Conditions Amenable to Physical Therapy."

Dr. Richard Kovacs addressed the Queens County Medical Society at Forest Hills, N. Y., on Friday, May 7, on "Physical Therapy in Arthritis and Rheumatoid Conditions."

Medical Officers Promoted to Brigadier Generals

In an announcement sent from the White House on March 25 it is stated that the President recommended to the Senate the promotion of the following medical officers from the rank of colonel to brigadier general (temporary):

Col. George F. Lull, now in charge of personnel in the Office of the Surgeon General.

Col. James S. Simmons, epidemiologist.

Col. Norman T. Kirk, commanding officer of the Percy Jones General Hospital, Battle Creek, Mich.

Col. Leon A. Fox, recently assigned to the special commission on typhus fever.

Australia Provides Yanks With Hospital

The government of Australia, under its program of reciprocal lend-lease, has provided the United States with a new ten story hospital "somewhere in Australia" to be used by American soldiers, sailors and marines recuperating from illness and wounds suffered in the Pacific. The transfer does not involve payment of any sort. The building, construction of which was under-

taken as a civic enterprise at a cost of \$3,000,000, was taken over and adapted for the American forces to accommodate several times its original capacity. It is complete with laboratories, operating rooms, nurses' quarters and administrative offices. All ten stories are now being used. The main buildings are well arranged. Verandas for convalescents are supplemented by broad spaces on the roof, where servicemen gather to rest in glass enclosed rooms or in the open air. Recreational equipment is available. The new hospital is one of many Australian contributions to the United States forces in the Pacific as reciprocal lend-lease.

Walter Reed Hospital's Convalescent Center

A convalescent center for Walter Reed General Hospital has been opened in the buildings which were formerly the National Park College, a school for girls at Forest Glen, Md. The convalescent unit provides an additional 1,150 beds, bringing the total capacity of Walter Reed Hospital to 3,325 beds. Careful planning has resulted in the fullest use of the facilities of the girls' school, located in beautiful park grounds which provide extensive recreational facilities, a swimming pool, bowling alley, amusement hall, gymnasium and walks and drives through shady groves. The excellent chapel contains a pipe organ and two libraries for patients. The clinic facilities for physical therapy, occupational therapy and dental work are extensive. The commanding officer at Walter Reed General Hospital is Brig. Gen. Shelly U. Marietta, Assistant Surgeon General, who is also in command of the Army Medical Center. General Marietta has had a distinguished administrative and professional career dating back to 1910, when he first entered the military service.

Scholarships for Physical Therapy Aides

Word has just been received by Dr. Frank H. Krusen, Secretary of the Sub-Committee on Physical Therapy of the National Research Council from Mrs. L. P. Ristine, Chairman of the Committee on War Work of the Pi Beta Phi Fraternity, Mt. Pleasant, Iowa, stating that that fraternity had decided "to set up a number of scholarships available to college women for training as physical therapy aides."

Mrs. Ristine continues, "We are offering ten scholarships of \$400 each to be used either as tuition or living expenses, or both. If the demand exceeds our present appropriation, we will undoubtedly continue to raise additional funds for this very important and understaffed field."

Wartime Graduate Medical Meetings

Under the auspices of the American Medical Association, the American College of Physicians and the American College of Surgeons a series of Wartime Graduate Medical Meetings is in process of organization. These meetings are authorized, as far as they concern the armed forces, by the Surgeon Generals of the Army, Navy and Public Health Service. The organizations concerned have appointed a committee of three men—one from each organization—to proceed with the work of administration. This committee includes Dr. Edward L. Bortz (chairman, 4200 Pine Street, Philadelphia), Dr. William B. Breed (secretary-treasurer) and Dr. Alfred Blalock.

The Plan

For organizational purposes, the country has been divided into twenty-four sections and key committees of three men appointed in each section to carry on the details of the program. Likewise, to insure a most worthwhile program a group of qualified authorities has been designated to serve as national consultants in the various special fields.

The duties of the section committees are:

1. To be responsible for the details of programs at each service hospital in their respective regions, where programs are to be conducted.
2. To be responsible for the selection of teachers and speakers, with the assistance of the central committee and of the national consultants.
3. To arrange time of meetings and schedules of travel and appearance of the teachers within their respective territories.
4. To furnish copies of the programs to the commanding medical officers of the hospitals (programs shall be mimeographed or otherwise reproduced by the hospitals themselves).
5. Supervision of expenses, which shall be limited to necessary travel costs; also the forwarding of statements of these to the secretary of the central committee, Dr. William B. Breed.
6. To obtain from the commanding officers at the end of the period of instruction a written statement concerning their impressions, and those of their staff, regarding the value of the courses, and suggestions for improvement.

The duties of the consultants are:

1. Each consultant to prepare a specimen six hour teaching schedule for a one day period.
2. To cooperate with the regional committees in working out local programs and securing the teachers.

When the teaching schedules have been prepared by the consultants and lecturers have assembled, the programs will be submitted to the Surgeon Generals of the Army, Navy and Public Health Services and the commanding officers of the various army corps commands and naval districts. When the desire for courses is indicated, the details will be arranged through the local committee with the assistance of the key schedules and the appointment of speakers.

In states where postgraduate activities are already being extended in the direction of service hospitals,

it will be the policy of the Committee for Wartime Graduate Medical Meetings to turn over requests that may come to it to the group which is already functioning. Furthermore, it desires to cooperate in every way possible with committees of local or state medical societies.

The teaching schedule will include ward walks, clinics, practical demonstrations, moving pictures, lectures and conferences offered to medical installations throughout the entire nation.

In carrying out the plans of the committee, no single pattern can be strictly followed. However, suggested methods of approach are herewith listed:

(a) Meetings such as those already held in Boston, Philadelphia and Chicago, where lecturers addressed groups in various camps on successive nights, or a one day meeting at a central point with several outstanding speakers embracing topics of vital interest.

(b) The organization of teams which may arrange to visit one or more camps in nearby areas to put on a one day and evening program. Such teams may appear at two or three adjacent camps on successive days.

(c) In areas where five or six service hospitals are within reasonable distance from a central distributing center, a complete six day postgraduate program may be offered on the following basis:

The organization of six teams of two or more authorities each, from different medical specialties, to appear at the five or six hospitals in that area, each team on one particular day for five or six consecutive weeks. The program may include teaching ward rounds and laboratory demonstrations for small groups in the morning hours. Motion picture exhibits and one lecture with a question and answer period may be presented in the afternoon and a further lecture, seminar or round table conference in the evening.

It is evident that any of the foregoing plans, all of which are tentative and illustrative only, might have to be modified to meet local conditions. However, teams of teachers should be available in the various medical concentration areas throughout the country to conduct full courses of instruction where needed. Also it may be expedient at occasional intervals to repeat this circular or peripatetic plan two or even three times a year, depending on the change of medical personnel in the service hospitals.

It is the desire of the organizations in charge to extend to the doctors in the armed services the best facilities of American medicine in the interest of our fighting men.

Committee for Wartime Graduate Medical Meetings—Board of National Consultants

1. Anesthesia—John S. Lundy, 102 Second Avenue S. W., Rochester, Minn.
2. Aviation Medicine—Lieut. Col. W. Paul Holbrook, M.C., U. S. Army Air Surgeon's Office, Headquarters, Army Air Force, Washington, D. C.
3. Cardiovascular Problems—William D. Stroud, 1011 Clinton Street, Philadelphia.
4. Chemotherapy—Chester S. Keefer, 65 East Newton Street, Boston.
5. Dermatology—

6. Dysenteries—Lieut. Col. Thomas T. Mackie, M.C., U. S. Army, 6817 Georgia Avenue N. W., Washington, D. C.
7. Epidemiology and Laboratory Medicine—Roy R. Kracke, 441 Clairmont Avenue, Decatur, Ga.
8. Gastrointestinal Diseases—Walter L. Palmer, 950 East 59th Street, Chicago.
9. General Internal Medicine—David P. Barr, 525 East 68th Street, New York.
10. General Surgery—Irvin Abell, 321 West Broadway, Louisville, Ky.
11. Malaria—Henry E. Melaney, 477 First Avenue, New York.
12. Neurology and Neurosurgery—Tracy J. Putnam, 710 West 168th Street, New York.
13. Nutrition—John B. Youmans, Vanderbilt University Hospital, Nashville, Tenn.
14. Orthopedic Surgery—George E. Bennett, 4 East Madison Street, Baltimore.
15. Physical Therapy—Frank H. Krusen, 102 Second Avenue, S. W., Rochester, Minn.
16. Plastic and Maxillofacial Surgery—Robert H. Ivy, 1930 Chestnut Street, Philadelphia.
17. Psychiatry—Arthur H. Ruggles, 305 Blackstone Blvd., Providence, R. I.
18. Psychosomatic Medicine—John Romano, Cincinnati General Hospital, Cincinnati.
19. Radiology—Byrl Kirklin, 102 Second Avenue S. W., Rochester, Minn.
20. Respiratory Diseases—Francis G. Blake, 789 Howard Avenue, New Haven, Conn.
21. Rheumatism and Arthritis—Ralph Pember-ton, 2031 Locust Street, Philadelphia.
22. Shock, Burns and Plasma—Lieut. Col. Douglas B. Kendrick, Jr., M.C., U. S. Army, Army Medical Center, Washington, D. C.
23. Shock, Burns and Plasma—Commander Lloyd D. Newhouse (MC), U. S. N., Naval Medical School, Bethesda, Md.
24. Thoracic Surgery—Leo Eloesser, 490 Post Street, San Francisco.
25. Traumatic Surgery of the Abdomen—Frederick A. Coller, 1313 East Ann Street, Ann Arbor, Mich.
26. Tuberculosis—Lieut. Col. Esmond R. Long, M.C., U. S. Army, Army Service Forces, Office of the Surgeon General, War Department, Washington, D. C.
27. Urology—Herman L. Kretschmer, 122 South Michigan Avenue, Chicago.
28. Venereal Diseases—Raymond A. Vonderlehr, U. S. Public Health Service, Washington, D. C.—J. A. M. A. **122**:45 (May 1st) 1943.

Second Largest Grant, \$150,000, Launches New Polio Offensive at Yale

The launching of another major offensive in the infantile paralysis fight was disclosed early in April when President Basil O'Connor announced that a five-year grant, totaling \$150,000, had been made to the Yale University School of Medicine, New Haven, Conn., for the establishment of the Yale Poliomyelitis Study Unit.

The grant, the second largest made by the Foundation, will make it possible for Yale to reorganize and expand its research on the epidemi-

ology, or spread, of the disease. The only larger grant by the Foundation was for \$300,000, also covering a five-year period, made last July to The Johns Hopkins University, Baltimore, to establish and conduct the Center for the Study of Infantile Paralysis and Related Virus Diseases.

Dr. John R. Paul, professor of Preventive Medicine at the Yale University School of Medicine and a member of our Committee on Epidemics and Public Health who has made many notable contributions to scientific knowledge in the field of the epidemiology of polio, will have full authority and responsibility for determining the nature of such laboratory and field studies as may be conducted. But a special Advisory Committee of the Foundation will be appointed by Mr. O'Connor to consult with Dr. Paul and his associates as the need arises.

Insofar as the Study Unit facilities permit, the National Foundation may send to the Unit persons, properly qualified in the opinion of the Foundation's Medical Advisory Committee, to pursue definite lines of investigation. The facilities of the Study Unit will be made available to the Foundation in time of epidemic, if needed.

In 1931 the Yale Poliomyelitis Commission was established by Dr. Paul and the late Dr. James D. Trask, as a result of emergency problems growing out of the serious epidemic of polio which swept New England that year.

In announcing the grant, Mr. O'Connor said: "It now seems advisable to place the Commission's work on poliomyelitis on a more permanent basis than has heretofore existed. The Yale University School of Medicine will reorganize its investigation of poliomyelitis problems and henceforth studies will be conducted in the Poliomyelitis Study Unit in the Section of Preventive Medicine, under the direction of Dr. Paul.

"In view of the present war some doubt might exist as to whether such research can be maintained. Such doubt is resolvable by the grim fact that wartime frequently amplifies the opportunity for such study. Research into the spread of poliomyelitis should continue now more than ever because so many new lines of investigation have opened up and the wartime drain on medical services has left fewer properly trained people to pursue the study of how the disease of poliomyelitis is transmitted."

None of the funds granted by the Foundation will be used for the construction of new buildings, space being arranged by the Yale University School of Medicine.

Army-Navy "E" Award

We are pleased to announce that on April 3, 1943, the War Department officially awarded to the Harrison Works of the RCA Victor Division of the Radio Corporation of America, for the second time, the Army-Navy Production Award for meritorious service. This award is manifested by the addition of a white star to their Army-Navy "E" pennant which they received in September, 1942.

Civilian Defense Affiliated Medical Units

The following resolution has been passed by the Directing Board of the Procurement and Assignment Service:

As a measure of protection for the civilian population in case of enemy action, the United States Public Health Service in cooperation with the Medical Division, Office of Civilian Defense, has invited selected hospitals and medical schools to organize affiliated units of physicians in accordance with a specific table of organization. The physicians of these units are asked to accept reserve commissions in the U. S. Public Health Service on an inactive status with the understanding that they will be called to active duty only for the following purposes:

1. To provide medical care for civilians who must be moved out of their communities of residence as the result of enemy action.

2. To provide temporary medical care in extreme emergency for military personnel in extemporized hospitals in the area.

Affiliated units will be called to active duty only on the recommendation of the respective state chiefs of Emergency Medical Service. In selecting units for activation, the state chiefs will call on those physicians who can best be spared temporarily from their civilian practice. By virtue of this arrangement, civilian medical needs will be safeguarded against haphazard withdrawal of physicians in an emergency.

The Directing Board of Procurement and Assignment Service fully approves of the formation of affiliated units for the purpose outlined and urges all state chairmen of the Procurement and Assignment Service to facilitate the organization of these units in every way possible. Applicants for U. S. P. H. S. reserve commissions for service in the affiliated units should not be cleared with the Procurement and Assignment Service because the terms of their commissions fully protect the civilian medical needs of the communities in which the units are being organized. It is understood that the U. S. Public Health Service will accept applications only from the following groups: (1) physicians 45 years of age or older, (2) women physicians, (3) physicians of any age who are physically disqualified for military duty, (4) physicians already declared by the Procurement and Assignment Service to be essential for civilian needs.

In the case of each physician under 45 who is being considered for such a commission and who is physically fit for military duty, it is understood that the U. S. Public Health Service will obtain from the local Procurement and Assignment Service chairman concerned assurance that the physician has already been declared essential for civilian needs. The fact that Reserve Officers of the U. S. Public Health Service are now classified as 4-B by Selective Service does not affect this arrangement, since the Public Health Service has agreed that if such physicians holding inactive reserve commissions are subsequently declared by the Procurement and Assignment Service to

be available for military duty, they will be permitted to resign their commissions. — J. A. M. A. 122:121 (May 8) 1943.

Round Table on Rehabilitation American Psychiatric Association

Dr. Alfred P. Solomon of Chicago acted as Moderator in the round table discussion on rehabilitation which was held as a part of the meeting in Detroit, May 11, of the American Psychiatric Association. The following leaders were invited to participate in the discussion:

Franz Alexander, M.D., Director, Institute of Psychoanalysis, Chicago; John Coulter, M.D., Regional Medical Officer, Sixth Civilian Defense Region; Member of Council of Physical Therapy, American Medical Association, Chicago.

Francis Gerty, M.D., Professor of Psychiatry, Head of Department, University of Illinois, College of Medicine, Chicago; Miss Marion Kalkman, Director of Nursing, Neuropsychiatric Institute, Chicago; Mr. L. Moholy-Nagy, Director, School of Design, Chicago; Colonel William C. Porter, M.C., School of Neuropsychiatry, Lawson General Hospital, Atlanta, Ga.; Sandor Rado, M.D., Educational Director, New York Psychoanalytic Institute, New York; Perry Rogers, M.D., Zone Surgeon, Maryland Casualty Company, Bone and Joint Surgery, Loyola University, Chicago; Clarence Selby, M.D., Chief, Medical Department, General Motors, Detroit, Michigan; Conrad Sommers, M.D., Chief Medical Officer, Neuropsychiatric Institutes, State of Illinois; Miss Marjorie Taylor, Executive Director, Curative Workshop, Milwaukee, Wisconsin; Major Perry V. Wagley, M.C., Director, Medical Division, Department of Psychiatry and Sociology, Sixth Service Command Rehabilitation Center, Fort Custer, Battle Creek, Michigan, and Mrs. Paula Weins, Educational Director, School of Psychiatric Nursing, Neuropsychiatric Institute, Chicago.

Memorial to Dr. Robert Tait McKenzie

Contributions are now being accepted for a memorial to Dr. Robert Tait McKenzie, Philadelphia, to take the form of a bronze casting of the Column of Youth and a suitable pedestal bearing an appropriate inscription to be placed in a prominent location in the headquarters of the National Education Association of the United States in Washington, D. C. The memorial was approved at a meeting of the American Association for Health, Physical Education and Recreation in 1939. In 1941 it was decided that medallions and prints of Dr. McKenzie's creations be made available for distribution to contributors of the general fund and that henceforth the cover of the *Journal of the American Association for Health, Physical Education and Recreation* carry a cut of "The Joy of Effort" or of some other one of Dr. McKenzie's creation. The medallions and prints are now available and it is hoped that through their distribution honor will be paid to the memory of the late Dr. McKenzie, who died

in 1938. A graduate of McGill University Faculty of Medicine, Montreal, in 1892, Dr. McKenzie was noted as a sculptor, writer and scientist. He was president of the American Association for Health, Physical Education and Recreation from 1912 to 1915, a past-president of the Society of Directors of Physical Education in Colleges and a fellow of the American Physical Education Association and of the American Academy of Physical Education. — J. A. M. A. **122**:128 (May 8) 1943.

Three New Physical Therapy Clinics

In the annual report of the Veterans Administration there is announced the opening of three new physical therapy clinics at Perry Point, Md.; Tuscaloosa, Ala., and Marion, Ill. One in the Los Angeles facility was closed temporarily because of the partial evacuation program instituted because of its critical location. An artificial fever therapy clinic was established at the Northport, Long Island, N. Y., facility and will be used as a center for training other physicians and nurses in the administration of artificial fever.

Misbranded Products—Abstracts of Notices of Judgment Issued by the Food and Drug Administration of the Federal Security Agency

[Editorial Note. — These Notices of Judgment are issued under the Food, Drug and Cosmetic Act and in cases in which they refer to drugs and devices they are designated D. D. N. J. and foods, F. N. J. The abstracts that follow are given in the briefest possible form: (1) the name of the product, (2) the name of the manufacturer, shipper or consigner, (3) the date of shipment, (4) the composition, (5) the type of nostrum, (6) the reason for the charge of misbranding and (7) the date of issuance of the Notice of Judgment—which is considerably later than the date of the seizure of the product and somewhat later than the conclusion of the case by the Food and Drug Administration.]

Vibratherm. — Vitaphore Appliance, Inc., South Bend, Ind. Shipped between April 29 and May 10, 1940. Composition: A black plastic cylindrical applicator with electrical connection so constructed as to apply heat and vibration to any portion of the body desired. Falsey represented as efficacious in the treatment of pelvic infections, prostatic trouble, melancholia, painful urination and severe pains in the back, loins and thighs. — [D. D. N. J., F. D. C. 392; March, 1942.] — J. A. M. A. **120**:785 (Nov. 7) 1942.

Simple Aids for Active Motion of Fractured Hips — Brookes and Leydig

(Continued from page 290)

Last but not least, the prospect for union and function is definitely enhanced.⁹

References

1. Blair, Harry C.: The Alteration of Blood Supply as a Cause for Normal Calcification of Bone, *Surg., Gynec. & Obst.* **67**:413 (Oct.) 1938.
2. Smith-Petersen, M. N.; Cave, E. F., and Vangorder, G. W.: Intracapsular Fractures of the Femur: Treatment by Internal Fixation, *Arch. Surg.* **23**:715 (Nov.) 1931.
3. Moore, Austin: Extra-Articular Fixation of Hip with Adjustable Nails, *Surg., Gynec. & Obst.* **64**:420 (Feb.) 1937.
4. Leydig, Stanley M., and Brookes, Theodore P.: Treatment of Pertrochanteric Fracture of the Femur with a Lag Bolt, *J. Missouri M. A.* **37**:354 (Aug.) 1940.
5. Neufeld, Alonzo J.: Article not yet published.
6. Mennell, James B.: Physical Treatment by Movement, Manipulation and Massage, Philadelphia, P. Blackiston's Sons, Inc., 1934, p. 297.
7. Anderson, Roger: Personal Communication.
Idem: Intertrochanteric Fractures, *J. Bone & Joint Surg.* **25**:153 (Jan.) 1943.
8. Whitman, Royal: Abduction Treatment of Fracture of Neck of Femur, *Surg., Gynec. & Obst.* **27**:578 (Dec.) 1918.
9. Brookes, Theodore P., and Ewerhardt, Frank H.: Fractured Hips in the Aged: Improved Prognosis Through Physical Therapy, *Arch. Phys. Therapy* **20**:29 (Jan.) 1939.

BOOK REVIEWS

THE KENNY CONCEPT OF INFANTILE PARALYSIS AND ITS TREATMENT. By *John F. Pohl*, M.D., Clinical Assistant Professor of Orthopedic Surgery, University of Minnesota; Attending Orthopedic Surgeon, Minneapolis General Hospital. In collaboration with Sister *Elizabeth Kenny*, Honorary Director the Elizabeth Kenny Clinics of Australia; Honorary Director the Elizabeth Kenny Institute, Minneapolis; Guest Instructor, University of Minnesota Medical School. With a foreword by *Frank R. Ober*, M.D., President, The American Orthopedic Association. Cloth. Pp. 368, with 114 illustrations. Price, \$5.00. Saint Paul and Minneapolis, Minnesota: Bruce Publishing Company, 1943.

This book is not advertised as the third edition of The Kenny Concept of Infantile Paralysis. However, it follows two previous publications, both of which were very inadequate. In this new book by Dr. John Pohl in collaboration with Sister Kenny, we finally have a comprehensive story of the Kenny Concept of Infantile Paralysis and its treatment.

It is divided into three parts, the acute stage, the convalescent stage and the chronic stage. The emphasis on spasm, alienation and incoordination is now familiar to everyone. Dr. Pohl has correlated these clinical symptoms with the corresponding treatment of hot packs and muscle reeducation. Muscle stimulation and muscle reeducation are described in detail, and form an interesting addition to our muscle training program. The book is well illustrated, but could have been improved by more severe editing. It is to be deplored that such a common term as specific therapy is misunderstood and that the only statistics of follow-up are not endorsed by the hospital staff from which they supposedly originate.

However, Dr. Pohl and Miss Kenny have given us a valuable contribution to infantile paralysis, which is being tried out everywhere today. We should withhold some of our superlatives until the five year follow-ups come in. This book is highly recommended to medical men, physical therapy technicians and nurses. It fills a great demand in a great cause.

TREATMENT OF FRACTURES. By *Guy A. Caldwell*, M.D., Professor of Orthopedic Surgery, Tulane University of Louisiana School of Medicine. Cloth. Pp. 303, 92 illustrations. Price, \$5.00. New York: Paul B. Hoeber, Inc., Medical Book Department of Harper & Brothers, 1943.

This compact textbook, written by the professor of orthopedic surgery at Tulane University of Louisiana School of Medicine, is divided into seventeen sections: (1) general consideration, (2) treatment of simple fractures, (3) treatment of

compound fractures; (4) fractures of the hand, (5) carpal fractures and dislocations, (6) fractures of the lower extremity of the radius and ulna, (7) fractures of the shaft of the radius and ulna, (8) fractures of the head of the radius, (9) fractures of the olecranon process and dislocations of the elbow, (10) fractures of the humerus, (11) fractures of the clavicle and scapula, (12) fractures of the sternum and ribs, (13) fractures of the spine, (14) fractures of the pelvis, (15) fractures of the femur, (16) fractures of the tibia and the fibula, and (17) fractures of the bones of the foot.

The book is well illustrated with clear line drawings throughout and it is exceptionally well documented. At the end of each section appears an extensive list of references to recent pertinent articles.

The immediate treatment of fractures is ably and completely discussed, but the author has neglected almost entirely discussion of the treatment of fractures during the convalescent stage. The physician interested in physical therapy will be disappointed to find in the index no reference to applications of heat or massage and only one or two brief references to the employment of exercise. Like many another surgeon who is interested only in the actual surgical procedures to be employed in the management of fractures, Dr. Caldwell has neglected one of the three chief principles in the treatment of fractures which have been described by Dr. Philip Wilson as follows: "First, restoration of anatomic form as soon as possible after injury; second, maintenance of alignment and fixation of the fracture during the period of healing; third, institution of measures to overcome the circulatory disturbance and to maintain and develop function beginning at the earliest possible moment after injury and continuing until complete recovery is obtained."

Dr. Wilson stated with regard to the third principle, "The only measures at our command capable of accomplishing this purpose belong to the domain of physical therapy and they should be included just as regularly in the treatment of fractures and employed with the same skill as are reduction of the fracture and splinting to maintain alignment."

It is sincerely to be hoped that in future editions of Dr. Caldwell's book he will devote more attention to this phase of the treatment of fractures. If he had made the title of his book less inclusive, one could forgive the neglect of the important phase of physical treatment but, since the author calls the textbook simply "Treatment of Fractures," one would expect it to discuss fully all phases of the subject.

Despite this one serious weakness in the text, it can be recommended as an excellent and up-to-

date textbook dealing in careful detail with the recent developments in the immediate treatment of fractures.

SYMPTOM DIAGNOSIS. By *Wallace Mason Yater*, A.B., M.D., M.S. (in Med.), F.A.C.P., Professor of Medicine and Director of the Department of Medicine, Georgetown University School of Medicine; Physician-in-Chief, Georgetown University Hospital; Physician-in-Chief, Gallinger Municipal Hospital, Washington, D. C.; Formerly Fellow in Medicine, The Mayo Foundation. Originally written by the late *Wilfred M. Barton*, A.M., M.D., F.A.C.P., and the present author. Fourth edition. Cloth. Pp. 900; 17 tables of differential diagnosis. Price, \$10.00. New York and London: The Appleton-Century Company, Incorporated, 1942.

This is the fourth edition of this useful volume on differential diagnosis. Seventeen diagnostic tables have been added, increasing considerably the value of the text. The two indexes of the former editions have been combined into one. The volume is intended as a manual for ready reference. It is divided into two sections: one on regional symptoms and the other on general symptoms. The presentation is essentially the same in both sections. At the beginning of the discussion of each symptom, there is an introductory note which presents those causes which cannot be classified as diseases. Following this note, individual diseases which exhibit the symptoms are discussed in the order of their importance and the usual accompanying symptoms are enumerated. At the end of each discussion, there is given a list of the less common conditions in which the symptom may occur. For each symptom, therefore, there is a complete but concise exposition which can be read in a few minutes. This book can be highly recommended as a handy office reference work for the busy physician in his daily contact with diagnostic problems.

PSYCHOLOGIC CARE DURING INFANCY AND CHILDHOOD. By *Ruth Morris Bakwin*, A.B., M.A., M.D., Assistant Clinical Professor of Pediatrics, New York University College of Medicine; Director of Pediatrics, New York Infirmary for Women and Children; Assistant Pediatrician, Bellevue Hospital, New York City; and *Harry Bakwin*, B.S., M.D., Associate Professor of Pediatrics, New York University College of Medicine; Associate Pediatrician, Bellevue Hospital, New York City; Consultant, Middletown Hospital, Middletown, New York. With Foreword by *Lawrence K. Frank*, B.S. Since 1923 Executive Officer in various Foundations concerned with studies of child growth and development and mental health. Fellow: Society for Research in Child Development; American Orthopsychiatric Association; A. A. A. S. Cloth. Pp. 331 with 31 illustrations. Price, \$3.50. New York: D. Appleton-Century Company, 1942.

This book is written by pediatricians for the pediatrician. As such it evidences the extent to which study of child behaviour and the ability to advise

parents intelligently with respect to its problems are being incorporated into the practice of pediatrics.

"In a field where so much is controversial," say the authors, "it is important that the physician remain as nearly as possible within the realm of common sense and experience. Too rigid an attitude is to be avoided and traditional parental attitudes respected until they have been adequately evaluated." This advice to the physician has been admirably followed by the authors themselves with respect to their analysis of the child and his problems, the attitudes of parents and the advice to be given. There is little that is theoretical, nothing that is faddish in the book.

As the title of the book implies, its emphasis is placed on the normal child and his behaviour at different levels of maturation together with the attitudes of parents as they react to these and to the innate unchangeable pattern of the child. And to these and to the problems arising from them in the home the greater number of its pages are devoted. From birth through adolescence difficulties and problems, discipline and training, school and social relations are well covered, always with concrete recommendations for the prevention and treatment of antisocial attitudes, habits, and behaviour. These latter are presented with a kindness, understanding and common sense that give them the recommendation of reasonableness rather than a demand for perfection. For the evaluation of the child who deviates from the normal average, excellent chapters on Superior Intelligence, Inferior Intelligence and Special Talents are included with an appraisal of the various intelligence tests in common use and advice as to the management of children falling in these classes. The pediatrician will also appreciate those chapters, dealing with the psychologic care of children in hospitals and those with certain diseases and disabilities.

Finally, the brief section on Repair of Psychologic Injury should give the pediatrician confidence and a soundly based optimism with respect to the efficacy of psychologic care and the recuperative powers of the child in the field of personality. In this the authors say: "The persons who are permanently affected by improper training are those in whom the unfavorable treatment has continued to operate over long periods during childhood and even into adult life. If the situation is rectified soon enough, there is every reason to believe that the effect on personality will be without serious consequences in the large majority of instances." The transmission of such prognoses to confused parents, made fearful and uncertain in the handling of their children by the spate of criticism that of recent years has fallen on their heads will doubtless have therapeutic value in and of itself.

Clearly and concisely written, without resort to the obscurant verbiage of many of the psychiatric treatises of the not far distant past, fully indexed and with short bibliographies of general texts for the use of both physicians and parents, the book should rate as a "must" for the physician who has children among his patients as well as for the pediatrician.

GAS WARFARE: A MONOGRAPH FOR INSTRUCTORS. Compiled by W. K. Fitch. Published by the Pharmaceutical Society of Great Britain. Paper. Price, 2s, 6d. Pp. 103. London: The Pharmaceutical Press, 1942.

Modern chemical warfare started when chlorine was released against the British troops north of Ypres on April 22, 1915. Since that date over 4,000 different chemical substances have been examined for their suitability as poison gas. This booklet collects the papers on chemical warfare that have been published in the *Pharmaceutical Journal*. The editor of this booklet complains of the fact that in his country in neither the Civil Defense Service nor the Home Guard has any serious attempt been made except in one important respect—the gas identification service—to recruit chemists for chemists' jobs. The Civilian Defense in the United States is apparently doing a better job. This book could be read with profit by those in the United States in Civilian Defense concerned with gas cleansing of persons and the decontamination of areas, buildings, vehicles and weapons.

MANUAL OF INDUSTRIAL HYGIENE AND MEDICAL SERVICE IN WAR INDUSTRIES. Prepared by the Division of Industrial Hygiene of the National Institute of Health, U. S. Public Health Service and issued under the auspices of the Committee on Industrial Medicine of the Division of Medical Sciences of the National Research Council. Edited by William M. Gafsafer, D.Sc., Chief of the Statistical Unit of the Division of Industrial Hygiene. Cloth. Pp. 508, illustrated. Price, \$3.00. Philadelphia: W. B. Saunders Company, 1943.

Dr. Clarence Selby, Chairman of the Committee on Industrial Medicine, National Research Council, writes the foreword to this volume. He states that "this book is intended not only as a source of information for industrial physicians who must meet the changed conditions in industries converted to war purposes, but as a guide for those who patriotically volunteer to take the places of industrial physicians who have gone into the service." He further states: "There are about 17 million workers in the war industries, and their number is steadily increasing. Consequently, they comprise a substantial section of the population, whose health is of immeasurable importance to the war effort. For the protection of their health and for the reduction of sickness absenteeism, which interferes so greatly with production, these workers depend on an equally substantial proportion of the available civilian physicians of the United States."

The contributors to this book are all members of the U. S. Public Health Service except Lydia G. Giberson, M.D., of the Metropolitan Life Insurance Company. It is divided into three parts: organization and operation of facilities; prevention and control of disease in industry; and control of disease in industry; and the manpower problem. The Division of Industrial Hygiene, National In-

stitute of Health, United States Public Health Service has prepared this text which is small enough to give compact knowledge and yet large enough to cover the entire subject. It emphasizes the salient points of this large field based on the divisions' many years of experience in the industrial hygiene field. This book should be in the library of every industrial physician.

THE 1942 YEAR BOOK OF OBSTETRICS AND GYNECOLOGY. Edited by J. B. Greenhill, B.S., M.D., F.A.C.S., Professor of Obstetrics and Gynecology, Loyola University Medical School, Chicago. Cloth. Pp. 672 with 144 illustrations. Price, \$3.00. Chicago: The Year Book Publishers, Inc., 1943.

The tremendous responsibility of editing the first Year Book of Obstetrics in which the name of Dr. De Lee does not appear has been admirably discharged by Dr. Greenhill, who pays tribute to the memory of this great obstetrician in an interesting sketch of his life.

One can only cite isolated examples of the information that is reported from the literature of this field during the past year. Attention is called to Alfred C. Beck's article detailing his illustrated presentation of "The Technic of a Modified Local Anesthesia for Cesarean Section." From an article on caudal anesthesia there is an illustration of the sacral canal. Mention should be made of the three phases in the conservative management of acute inversion of the uterus; certain facts concerning vitamin K, to the effect that while the blood prothrombin levels of the mothers and babies were raised the vitamin did not affect the frequency of hemorrhagic manifestations in the new born; the extra-peritoneal Cesarean Section of the "Waters" technic is illustrated; new facts on erythroblastosis fetalis; many other illustrations in operative technics are included, such as Dr. Heaney's technic for vaginal hysterectomy (which the reviewer considers is about the best) is given step by step. This is a must book for the obstetrician, gynecologist and the medical practitioner all of whom will be grateful to the publishers and the editor who have made available practically all of the world's literature for their bookshelf in this condensed form.

A VENTURE IN PUBLIC HEALTH INTEGRATION. The 1941 Health Education Conference of the New York Academy of Medicine. Cloth. Price, \$1.00. Pp. 56. New York: Columbia University Press, 1942.

This small monograph on health education contains three articles presented before the New York Academy of Medicine. The first article, by Edward J. Stieglitz, deals with the "Role of Health Education in the Promotion of Optimal Health and in the Retardation of Degenerative Diseases." The second article, by Edward L. Bernays, deals with "Barriers to Health Education," and the third article, by Allen Freeman, discusses "Health Educa-

tion by the Private Practitioner, the Voluntary Agency, and the Department of Health."

As Allen Freeman has pointed out, health education is not one but many things: it is a health department nurse showing a negro mother how to sterilize nursing bottles; a physician in a tuberculosis clinic telling the patient with open tuberculosis how to minimize the risk of infection to others; a county health officer talking to the Parent-Teacher Association; the freshman class in hygiene at a midwestern state university; an exhibit of food values at a county fair; a play produced over the radio; or a news story in the local paper. It is all these things and many more. The three authors of the three sections of this book discuss succinctly numerous phases of the problem of health education. This monograph will be found interesting to every person who is concerned with public health.

UROLOGY. *William H. Mencher*, A.B., M.D., F.A.C.S., Associate Urologist, Harlem Hospital; Adjunct Urologist, Mt. Sinai Hospital, New York. Cloth. Price, \$2.00. Pp. 205. London, New York and Toronto: Oxford University Press, 1942.

We believe the title of this book is wrong; it is not a book on urology but is an outline of the different subjects in urology and in that respect is well done. As a guide for the various subjects to be considered, it serves a useful purpose. The author has well defined its purpose in the preface.

FLYING MEN AND MEDICINE. THE EFFECTS OF FLYING UPON THE HUMAN BODY. By *E. Osmun Barr*. Cloth. Pp. 270, illustrated with drawings and diagrams. Price, \$2.50. New York: Funk & Wagnalls Company, 1943.

This book, according to the author, has three purposes: first, to provide information for "the great group of young people from which the flyers must come"; second, it is written "for the mothers and fathers of flyers"; and third, it is "a story told to the great reading public."

The book has been divided into two parts: one dealing with the effects of flying on "the nervous system and contributing parts" and the other dealing with "the other systems of the body." The author has succeeded exceptionally well in conveying a great deal of valuable information to the average layman. While the book is written primarily for lay reading, a physician interested in aviation medicine will find in it useful information and guidance in instructing prospective flyers concerning the facts of aviation medicine.

As Colonel James H. Defendorf has pointed out in the introduction: "With the tremendously accelerated interest in aviation which has been stimulated by the war, this book makes its appearance at a most opportune time. By encouraging promising candidates, and discouraging those who should not take up flying, it should be instrumental not only in the saving of much useful time by both medical examiner and applicant, but also in avoiding needless risk to personnel as well as material."



PHYSICAL THERAPY ABSTRACTS

The Kenny Principles and Injuries of the Knee Joint. Vernon L. Hart.

J. A. M. A. 120:900 (Nov. 21) 1942.

Following an injury to a knee joint one can demonstrate muscle spasm, mental alienation of muscle and incoordination of muscle function. These are the three cardinal attributes in the stages of poliomyelitis which Miss Kenny recognizes and treats, and she has demonstrated them to the satisfaction of the medical profession.

Relief of spasm is the first consideration in the treatment of the acute stage of internal derangement of the knee. Treatment is begun immediately. The patient is placed in bed on a firm mattress in the normal position of rest and the flexed knee supported by a fracture pillow, rolled towel or blanket. An upright board placed at the foot of the bed serves to stimulate the normal stand and postural reflexes. The foot is not placed against the foot board during the period of active and painful muscle spasm. The Kenny treatment employs the use of moist heat. Wool flannel packs are immersed in boiling water, wrung twice through a tight wringer at the bedside and quickly applied over the entire area of involved muscles and tendons. The moist pack is covered with oiled silk and then with dry flannel. The pack is changed about every two hours and discontinued during the night. Burns do not occur if the packs are wrung quite dry. The relief of pain, muscle spasm and deformity is frequently dramatic. Aspiration of knee joint hemarthrosis is rarely necessary. A plaster of paris splint is not applied to the injured extremity.

The flexion deformity is the result of muscle spasm. Manipulation to reduce a suspected displaced semilunar cartilage is contraindicated.

Cancer of the Larynx. F. E. LeJeune, and P. J. Bayon.

New Orleans M. & S. J. 95:133 (Sept.) 1942.

Suspension laryngoscopy is the only method of direct laryngoscopy which, besides providing satisfactory visualization, makes it possible to use both hands in intralaryngeal manipulations; and bimanual operation must be employed for the successful extirpation of malignant lesions of the vocal cords.

The amount of tissue to be removed having been decided on, a sharp laryngeal knife is employed for the excision. This is immediately followed by electrocoagulation which, besides providing insurance against recurrence helps to control hemorrhage. If undue trauma has been avoided, the postoperative reaction should be negligible.

Formerly it was necessary to use chloroform anesthesia if electrocoagulation was to be employed. This was one of the objections to this method of operation. Since the development of pentothal-sodium, this objection has been removed. Pentothal-sodium is reasonably safe and produces sufficient relaxation for the proper performance of suspension laryngoscopy.

Mechanism of Asphyxial Resuscitation: Resuscitation With Inert-Asphyxiating-Gas in Advanced Asphyxia. G. L. Birnbaum, and S. A. Thompson.

Surg., Gynec. & Obst. 75:79 (July) 1942.

Further experimental data are presented by Birnbaum and Thompson to show that in advanced asphyxia resuscitation can be effected after respiration had ceased and the circulation was rapidly failing by rhythmic inflation and suction on the lung with an inert gas such as nitrogen or helium—asphyxial resuscitation. Advanced states of asphyxia were produced by obstruction of the trachea or by inhalation of inert—asphyxiating—gases such as nitrogen or helium. If the asphyxiating procedure was not started within twenty to thirty seconds after respiration ceased, spontaneous recovery usually did not occur. However, if within forty-five seconds to two and one-half minutes after respiration ceased suck and blow resuscitation with inert—asphyxiating—gas was applied, resuscitation of the circulation and respiration was accomplished in 85 per cent of instances. The addition of 10 per cent carbon dioxide to the inert gas inhibited resuscitation. Bilateral vagus section before asphyxia was started prevented asphyxial resuscitation. The carotid sinuses are also greatly concerned in this phenomenon. Denervation of the carotid sinus before obstructive asphyxia resulted in a sluggish asphyxial resuscitation; denervation before nitrogen inhalation asphyxia prevented asphyxial resuscitation. Asphyxial resuscitation, which is primarily a reflex phenomenon, is initiated most efficiently by suck and blow resuscitation within safe limits of pressure and is successful in 85 per cent of instances as compared with 15 to 20 per cent by manual artificial respiration with nitrogen inhalation, rhythmic pressure with nitrogen or rhythmic suction or on the lung alternating with nitrogen inhalation. These facts suggest that asphyxial resuscitation is primarily a reflex from the vagus endings in the lungs to the medullary centers. The greater rhythmicity and adequate combined inflation and active deflation of the lung by the suck and blow resuscitator apparently more effectively stimulates the pulmonary vagal endings.

Repair of Severed Tendons of the Hand and Wrist. Statistical Analysis of 300 Cases. Harry Miller.

Surg., Gynec. & Obst. 75:693 (Dec.) 1942.

Physical therapy is begun early. With the first dressing at the sixth to the eighth day, mild active motion is encouraged following which the splint is reapplied with the fingers and wrist unchanged in their degree of flexion. At the fourteenth day, the degree of flexion at the metacarpophalangeal joint is lessened. Active restricted motion through a narrow range is permitted. After the twenty-first day more active restricted motion is obtained by moving the entire splint distalward; this permits active flexion, limits complete extension, and protects the involved digit against sudden extension injuries. The splint is removed on the twenty-sixth to the twenty-eighth day.

With regard to extensor tendons, complete immobilization is carried out for three weeks, following which guarded active motion is begun under the supervision of a physiotherapist. The splint is removed at the end of the fifth week, and active and passive exercises are encouraged. Exercise in the whirlpool bath and bathing of the hand in warm soapy water are helpful in hastening return of function.

The best results in the treatment of lacerated tendons are dependent on an accurate diagnosis of the underlying pathologic condition and on careful attention to the details of repair. As a rule, the diagnosis of the tendon and nerve injury is not difficult; a knowledge of the anatomy and physiology of the hand is essential. In the treatment of tendon lacerations, each case must be individualized as to its indication for primary repair. Careful mechanical cleansing and debridement of wounds which are less than four hours old, and which had not been heavily contaminated from human sources, will in a high percentage of cases heal by primary intention.

The apparent correlation between careful repair and good functional result dictates that meticulous attention to the details of repair, splinting, and physiotherapy be the prime considerations. Repair can best be accomplished in the presence of a bloodless field and under general anesthesia. Intelligent splinting and physiotherapy presupposes a knowledge of the various phases of tendon healing.

A review of the results in 136 cases on which adequate follow-up data is available brings to light the following facts:

1. Functional results are poorest in lacerations occurring over the proximal phalanges and middle phalanges.
2. Lacerations of flexor tendons occurring at the wrist and over the palm generally heal with good functional results.
3. Lacerations of the extensor tendons regardless of their location heal without functional disability in 92 per cent of the cases.

An analysis of the failures in this series is made, the greatest numbers occurring in the sec-

ond and third decades of life. Infection, prolonged splinting, inadequate splinting, errors in technic and in physical therapy, are responsible for the failures in the present series.

Effect of Muscular Exercise Upon the Peripheral Circulation in Patients With Valvular Heart Disease. D. I. Abramson; S. M. Fierst, and K. Flachs.

J. Clin. Invest. 21:747 (Nov.) 1942.

Using the venous occlusion plethysmographic method, the rate of resting peripheral blood flow and the circulatory response to exercise were studied in a series of 29 patients with insufficiency of the aortic semilunar valves, and in 16 subjects with mitral valvular disease.

The average circulation in the hands was found to be somewhat diminished in both series of patients as compared with that for the control series, while the readings in the forearm and leg in the majority of the cases fell within the normal range.

The post-exercise response of the blood vessels in the forearm to a specified amount of work was generally greater than that in the control group.

It was concluded that, in the majority of the patients with aortic insufficiency or mitral valvular disease, no evidence was found to indicate that excessive vasodilatation or vasoconstriction exists in the vessels of the forearm or leg.

On the basis of the results obtained with a period of exercise, it appears that either the compensatory circulatory mechanism elicited by such a stimulus are not as effective as normal, that the work is performed with less efficiency, or possibly that both mechanisms are operating in this condition.

Injuries to the Peripheral Nerves. J. F. Maurer.

J. Indiana State M. A. 35:620 (Nov.) 1942.

After suture of nerve or nerves the limb should be placed in such position as to prevent undue tension on the suture line. It is equally important to prevent adhesions between tendons and their sheaths, adhesions in periarticular structures, and maintenance of nutrition in the paralyzed areas. It is important that certain parts of the limb shall not be continuously immobilized. Large joints are not so likely to become stiff during fixation; but small joints, especially those of the wrist and fingers, must be given freedom of movement and they require daily active or passive exercising. Heat is an important aid and is easily available in the hot bath. When trophic ulcers are present radiant heat may also be used. Massage should be regular and methodical. At first galvanic current may be used on each individual muscle. The current should be the weakest which will cause or produce contraction or response. When faradic response returns it may be substituted for galvanic. Sinusoidal current may also be used. The post-operative period is the most important.

Recovery depends to a great extent on the person's ability to reeducate himself when return of function does occur.

While individual reports vary greatly it may be said generally that recovery of sensory portions of the nerves does not seem to be coextensive with motor recovery.

In the final appraisal of results certain nerves show a greater tendency to recovery than others. And there again is a wide divergence of opinion and statistics, as shown by different authors. Following a review of various works it would appear that recovery after repair is likely to occur in the following nerves or plexuses in the order as follows: Radial, sciatic, median, ulnar, tibial, peroneal, brachial plexus.

The Use of a Lamp to Warm Moist Compresses. Herman E. Pearse.

Ann. Surg. 116:776 (Nov.) 1942.

How to keep compresses hot is a perennial question on any surgical service. Its answer interests the nurse, administrator and surgeon, for practical technic, hospital costs and effective therapy are involved. The control of temperature probably influences the rate of healing of any wound but is especially important in lesions of an extremity having an impaired circulation, for here uncontrolled heat may cause harm.

Compresses are usually kept at a higher temperature than the surrounding air, so some external source of heat must be provided to counteract the normal heat loss. The five methods of supplying heat that have been used are: (1) The repeated application of a hot solution or frequent changes of hot dressings. (2) A poultice. (3) Hot water bottles. (4) An electric heating pad. (5) Radiant heat from a lamp. The repeated application of a hot solution or hot dressings is inefficient because of rapid cooling, after which the compress becomes cold and clammy.

The routine use of these lights for compresses is as follows:

- (a) The bed is protected with a rubber sheet.
- (b) The wound is dressed with two layers of moist gauze covered with oiled silk.
- (c) This dressing is covered or wrapped with a sterile towel.
- (d) A bath thermometer is placed near the wound.
- (e) The light is centered on the wound and raised or lowered until the thermometer reads 110 F.
- (f) Unprotected skin near the lamp may be covered with a towel to prevent discomfort.
- (g) Drafts near the lamp are avoided.
- (h) Compresses are moistened every three hours.

The temperature beside the wound may be from 5 to 10 F. lower than that of the bath thermometer outside the compress.

Some Physiologic Aspects of the Use of Sea Water to Relieve Dehydration. Robert F. Bradish; Merrill W. Everhart; William M. McCord, and William J. Witt.

J. A. M. A. 120:683 (Oct. 31) 1942.

According to physiologic views, the site of water and salt absorption is in the distal portion

of the small intestine and the colon. It would seem then that, regardless of into which end of the alimentary canal salt water was introduced, there would be little if any difference in the physiologic effect. The drinking of seawater results in the absorption of salt as a hypertonic solution and will necessitate the excretion of the salt eventually at the expense of the body fluids. This excretion will be through the kidneys, as pointed out previously.

In a normal state of hydration the drinking of sea water will result in an extra loss of fluid with a subsequent dehydration. In a state of dehydration with the absorption of hypertonic salt water, there would be a tendency for sodium chloride to accumulate in the tissue spaces. The osmotic pressure of the extracellular tissue fluid being increased would remove fluid from the tissue cells themselves and from the blood stream. If administration of salt water is continued in the face of progressive dehydration, a state of edematous dehydration would occur. With the loss of fluids from the blood stream and hemococoncentration, a dangerous state of extrarenal azotemia is produced.

We have shown experimentally that sodium chloride as contained in sea water is absorbed from the colon. This is in agreement with the findings of Pittard. However, our views as to the benefits incurred by this procedure are in absolute disagreement with those who advocate its use. We are convinced that the use of sea water per se by this means would not only not prolong life but would indeed actually hasten death.

The only further line of investigation that appears to be open is conceivably the use of salt free rations in conjunction with an amount of diluted sea water containing salt equal to that amount omitted from the rations. This problem of the use of salt free rations is being investigated.

It has been shown by both subjective and objective observations that the colon will not concentrate sea water and thus make water available to the organism. Therefore, by the same token, rectal instillations of sea water will not alleviate the symptoms of water deprivation.

Tendon and Nerve Injuries. Sumner L. Koch.

New York State J. Med. 42:1819 (Oct.) 1942

There is no greater fallacy the author thinks than the idea that early movement after tendon repair prevents the formation of adhesions. Early movement—i. e., during the first ten days—either causes rupture of the sutures, or, much more commonly, tearing out of the sutures and separation of the tendon ends. No one who has seen the soft callus which is present during the first week after operation can fail to be impressed with the vulnerable character of the structures that have been brought together and the importance of avoiding tension upon them during the early postoperative period.

After twelve or fourteen days have elapsed, the

addition of slight active movement but with maintenance of the position of relaxation brings the aid of physiologic tension to stimulate the healing process. This activity must be guarded and initiated slowly. Vigorous movement at the end of ten or twelve days, when fibrous tissue is bridging the gap between the tendon ends, can provoke an inflammatory reaction that causes intense proliferation of fibrous tissue and firm adhesions between sutured tendons and surrounding tissue. Again there is a definite analogy between the overgrowth of bone callus that results from too early movement, and which reaches its most marked development in the proliferation of bone that sometimes forms in the child who has sustained a fracture about the elbow.

Removal of the relaxing splint and the beginning of free active movement are postponed until three and a half or four weeks have elapsed.

Deformities of the Thoracic Spine as a Cause of Anginoid Pain. John R. Smith, and William B. Kountz.

Ann. Int. Med. 17:604 (Oct.) 1942.

It was emphasized earlier that measures which improved the posture of patients alleviated or abolished their discomfort. In this connection the work of Kerr is of some interest. He approached the treatment of angina pectoris from a unique standpoint with the supposition that angina may be the result of myocardial anoxemia enhanced by faulty refilling of the heart and hence diminished oxygen supply to vulnerable tissues. Many of his patients had exhibited impairment of diaphragmatic motion which he thought might further reduce the return flow of blood to the heart. Kerr applied abdominal belts to these patients, and sought improvement in posture. Many of his subjects improved under this regimen. In the light of our experience, it seems possible that the improvement he noted may have been due to the correction of general posture. Gallavardin stated that some cases of angina pectoris have a "collaring sensation," as of a portmanteau placed about the shoulders, radiating about the shoulder-girdle. The attacks, he noted, were transient or of long duration and might be provoked by movements of the upper extremities. He further stated that such episodes were usually indifferently relieved by nitrites. It is possible that Gallavardin may have been dealing with a problem similar to ours.

Report has been made of four of 15 patients having anginoid pain attributable to spinal deformity. Frequently the seizures could be induced by movements involving the deranged spinal segments. Procedures applied in an effort to improve posture brought about improvement or cure of the symptoms.

The mechanism of the production of dorsal root irritation was considered in the light of clinical findings and an experimental study was made in order to investigate the problem further. This was done by using a cadaver, with spinal

cord and nerves exposed, in which an abnormal degree of spinal flexion and extension could be produced. When the spine was either flexed or straightened to an abnormal degree, the spinal canal tended to become elongated so that the cord was drawn cephalad. This imposed tension on the spinal nerves particularly at their angulations through the spinal foramina and at their attachments to the cord. It was postulated that movement imposed on the nerves under such tension may give rise to irritation of the fibers with the production of referred pain.

Some of these patients experienced unexplained transient relief from the use of nitrites. It is emphasized that this phenomenon, if ignored, might lead to an incorrect diagnosis of angina pectoris.

The Electrical Shock Treatment of Psychoses.
William Furst, and John F. Stouffer.

J. Nerv. & Ment. Dis. 96:499 (Nov.) 1942.

It will be seen that 73 per cent of the affective-reaction group experienced a remission sufficient to permit discharge from the hospital. The average period of hospitalization for this group was forty-five days. Of the schizophrenics 24 per cent were discharged, the hospitalization period averaging three months. In the experience of the authors of one year with patients discharged in remissions, there have been recurrences in three schizophrenics, three manic-depressives and two involutional melancholias.

The treatment of psychoses has been advanced by the use of electrical shocks. Technic has been simplified, intravenous injections eliminated, fear of treatment dissipated and the discomfort borne by the patient greatly lessened without decreasing the beneficial effects of the treatment. It is apparent that electrical shock has a specific effect in the majority of cases of affective psychoses but, as with the metrazol convulsions, the improvement in schizophrenics, while of temporary value, is disappointing. The severe anxiety neuroses seem changed after a few treatments, permitting psychotherapy.

At the Philadelphia General Hospital the use of metrazol convulsions has been discontinued in view of the simplicity, inexpensiveness and favorable results of the electrical shock treatment. Careful evaluation of large series of cases and physiologic and neuropathologic studies on the effects of treatment are indicated.

The Use of Cold in Medicine. Lawrence W. Smith.

Ann. Int. Med. 17:618 (Oct.) 1942.

In spite of centuries of almost subconscious recognition of the usefulness of cold in the treatment of pain and fever, perhaps because of its very simplicity, its more extended use has only just begun to be explored. The brilliant work of Allen, Crossman and their associates in the peripheral vascular diseases and their associated surgery has pointed the way towards a new era for the diabetic and for military and civilian

traumatic injuries of the extremities. The pioneering of Talbott with generalized hypothermia in schizophrenia likewise opens the entire field of central nervous disorders to similar investigation. In our own work in malignant disease we believe we have conclusively shown the value of hypothermia in both localized and generalized application as an adjunct to other methods of treatment and especially in the management of the terminal stages of the disease. Its value in the control of pain is often truly phenomenal and for this reason alone the method should be employed widely in a variety of pain problems. Its use in the treatment of narcotism seems well substantiated. Its value in the control of infections locally cannot be over-emphasized. The clinical exploration of its value in a host of other pathologic states seems fully justified and urgently indicated. We must reexamine our present concepts of physiology in the light of these new temperature levels attained, and successfully maintained by man. Perhaps it is not too much to hope that as our knowledge grows, it may be possible clinically to reach safely the "critical" levels of tumor cell growth which our tissue cultures suggest may well be destructive to cancer cells, and thus add another truly effective weapon to the war against malignant disease. The evaluation of hypothermia as a therapeutic agent can only be attained by the combined efforts of the clinician and the laboratory man over a long enough period of time to discover its limitations as well as its usefulness. During this experimental period it is probably just as well that its more intensive application be limited to the larger institutions which have the facilities and personnel to carry out such investigative problems. In its present stage of development, like any other major therapeutic procedure—surgery, hyperthermia, even serum and chemotherapy—it is not without certain dangers, which must be recognized and methods designed to counteract them. These difficulties do not seem in the least insurmountable.

The Problem of Functional Disease as Seen in Industry. D. E. Bell.

Canad. M. A. J. 48:108 (Feb.) 1943.

The author has asked his colleagues at the Compensation Board for their opinion as to what proportion of the time lost following industrial injury is due solely to functional conditions. If we assume that some such figure as 20 per cent is somewhere near correct in the Province of Ontario alone, the man-day loss due to industrial injury was one and a quarter millions.

The term "traumatic neurosis" is really a misnomer. "Compensation neurosis" is much to be preferred, for, while trauma plays a very minor role, compensation plays a very large one. Generally speaking, the nature of the injury is much less important than the particular doctor who happens to be in attendance.

The trouble with a great many medical men

is that in their eagerness to treat the injury they neglect to treat the patient. Their surgical skill may be beyond reproach, yet it never occurs to them to question subjective symptoms even well after anatomical recovery appears to be complete. Worse still, they unwittingly lend themselves to the production of a functional state by careless remarks in the presence of the patient and his friends. Many a patient with avulsed transverse processes has been told he has a fractured spine instead of a muscle injury, and, of course, there are always friends who can recall cases in which dire consequences followed such injuries. To a patient the word of his medical attendant is the voice of experience and the confidence the doctor holds should be used for constructive purposes rather than wasted in gloomy prognoses. Now what is the answer to the problem? Unfortunately, the attitude of many is that matters of psychology are outside the scope of the surgeon and something for the neurologist and psychiatrist to worry about. By the time, however, the neurologist or the psychiatrist is sent for, the case is usually too difficult and complicated to permit of any easy solution. Furthermore, any surgeon or physician who thinks he can ignore psychology as an agent of healing is passing up one of the most potent forces at his disposal.

The Present Status of Fever Therapy in Neurosyphilis. A. E. Bennett.

Nebraska M. J. 27:317 (Sept.) 1942.

In severe paresis malaria is ineffectual since only 1 per cent improve compared with 10 per cent of remissions with artificial fever therapy. Yet the actual percentages were higher in all groups with artificial fever compared with malaria.

Fever induction by whatever means produces good results in neurosyphilis if sufficient height and duration of fever are induced.

There is no valid reason to assume that malarial therapeutic effectiveness is due to more than the fever induction.

The employment of auxiliary chemotherapy in conjunction with any type of fever therapy is an essential requirement.

The most opportune time to treat neurosyphilis with fever and chemotherapy is when the disease is first recognized in the asymptomatic phase.

Adequate fever and chemotherapy produce over 50 per cent complete clinical remissions in mild paresis and about 20 per cent in intermediate forms.

Physical artificial fever and chemotherapy are superior to other forms in the relief of tabes dorsalis, meningovascular, congenital and ocular syphilis.

Malarial therapy has certain advantages in the management of large numbers of patients congregated in under-staffed, under-equipped institutions.